Technical Memorandum

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

To:	*Caltrans District 3* – Sutha Suthahar
From:	*Wood Rodgers, Inc.* – Nawid Nessar, PE, TE; Mario Tambellini, PE
Cc:	*Wood Rodgers, Inc.* – Mark Rayback
Date:	10/07/2016
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Project #:	CT EA: 03-3F3600 – TO# 1, WR#: 8497.001
RE:	***US 50 HOV Lanes Project - Sacramento, CA*** ***Traffic Report Addendum***

INTRODUCTION

The Final US 50 HOV Lanes Project (Interstate 5 to Watt Avenue) Travel Demand Modeling and Traffic Microsimulation Traffic Report was completed by Wood Rodgers, Inc. in May 2015. Since the completion of the Traffic Report, Wood Rodgers has continued to provide Caltrans with additional traffic analysis services for the US 50 HOV Lanes Project (Project). This additional analysis was performed in support of environmental analysis, preparation of the project environmental document (ED), public outreach and open house meetings, and project development team meetings. This memorandum has been prepared to document the additional traffic analysis effort performed by Wood Rodgers since submittal of the May 2015 Traffic Report.

SUMMARY OF ADDITIONAL TRAFFIC ANALYSIS

Environmental Analysis and Document

Wood Rodgers performed the following tasks in support of air quality modeling and preparation of the ED:

- Prepared daily truck percentages and volumes for each segment of the US 50 study corridor. Daily truck percentages can be found in **Appendix A**.
- Prepared US 50 study corridor daily VMT by speed bin. VMT by speed bin can be found in **Appendix B**.
- Prepared study area ramp intersection delays and levels-of-service (LOS). Ramp intersection LOS data can be found in **Appendix C**.
- Prepared study area ramp intersection turning movement volume figures for all scenarios. Turning movement volume figures can be found in **Appendix D**.
- Assisted with the development of the traffic section of the ED, including data, discussion, and findings. Supplemental traffic data and discussion prepared for the ED are shown in **Appendix E**.

Public Outreach / Project Open House

Wood Rodgers preformed the following tasks in support of planned public outreach / open house meetings:

- Prepared a PowerPoint presentation and corresponding material that summarizes Project's traffic findings. The Project open house traffic presentation can be found in **Appendix F**.

- Prepared microsimulation videos showing projected future year traffic operations along the Project corridor, under with and without-Project conditions. Microsimulation videos can be provided upon request.
- Prepared new data, including year 2040 Project corridor daily VMT per person and year 2040 study area unserved vehicles per alternative. New data is summarized in the Project open house slides in **Appendix F**.

Project Development Team Meetings

Wood Rodgers preformed the following tasks in support of project development team meetings and to provide any additional information that was requested or questions that arose during the meetings:

- Prepared additional discussion of results and comparison of the alternatives.
- Communicated with Caltrans Project team staff to address any traffic related issues/questions that arose. Additional discussion of traffic findings can be found in **Appendix G**.

All additional traffic analysis performed for the Project was completed using data generated by the US 50 HOV Lanes *SACSIM* based travel demand models and *Vissim* microsimulation models created as part of, and documented in, the US 50 HOV Lanes Final Traffic Report, dated May 2016.

APPENDIX

Appendix A: Average Daily Traffic (ADT) Truck Percentage Comparison
Appendix B: Average Daily Mainline VMT Speed Distribution
Appendix C: PM Peak Hour Ramp Intersection Delay and LOS
Appendix D: Intersection Turning Movement Volume Figures – All Scenarios
Appendix E: Supplemental Traffic Analysis for the Environmental Document
Appendix F: US 50 HOV Lanes Traffic Analysis Open House Slides
Appendix G: Additional Discussion of Traffic Findings

APPENDIX A

Option 1 – Average Daily Traffic (ADT) Truck Percentage Comparison
US 50 Corridor Operations Summary - Future Year Scenarios
Average Daily Traffic (ADT) Truck Percentage Comparison

		Location	Facility Type	Truck Percentage												
				Year 2013 No Project	Year 2020 No Project	Year 2020 Add HOV Lane	Year 2020 Add Mixed Flow Lane	Year 2020 Take-a-Lane	Year 2030 No Project	Year 2030 Add HOV Lane	Year 2030 Add Mixed Flow Lane	Year 2030 Take-a-Lane	Year 2040 No Project	Year 2040 Add HOV Lane	Year 2040 Add Mixed Flow Lane	Year 2040 Take-a-Lane
EB	1	EB US 50 Mainline b/w Jefferson Blvd and I-5 Connectors	Mainline	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%	7.2%	7.3%	7.2%	7.2%	7.3%	7.3%	7.3%
	2	EB I-80/US 50 to NB I-5 Connector	Connector	7.2%	7.2%	7.2%	7.3%	7.2%	7.2%	7.3%	7.1%	7.6%	7.1%	7.1%	7.4%	7.3%
	3	EB I-80/US 50 to SB I-5 Connector	Connector	7.2%	7.4%	7.3%	7.3%	7.0%	7.2%	7.2%	7.3%	7.2%	7.3%	7.5%	7.3%	7.3%
	4	EB US 50 Mainline b/w Connector to I-5 and 5th St Off	Mainline	7.4%	7.2%	7.3%	7.3%	7.4%	7.3%	7.2%	7.3%	7.2%	7.2%	7.3%	7.3%	7.4%
	5	EB US 50 Off-Ramp to 5th St	Off-Ramp	7.3%	7.4%	7.3%	7.4%	7.4%	7.5%	7.2%	7.4%	7.2%	7.2%	7.2%	7.4%	7.3%
	6	EB US 50 Mainline b/w 5th St Off and Connectors from I-5	Mainline	7.4%	7.2%	7.3%	7.3%	7.4%	7.3%	7.2%	7.3%	7.2%	7.2%	7.3%	7.3%	7.3%
	7	NB I-5 to EB I-80/US 50 Connector	Connector	5.8%	5.7%	5.7%	5.7%	5.7%	5.8%	5.7%	5.8%	5.6%	5.7%	5.7%	5.7%	5.7%
	8	SB I-5 to EB I-80/US 50 Connector	Connector	8.6%	8.5%	8.5%	8.4%	8.6%	8.6%	8.4%	8.3%	8.4%	8.3%	8.2%	8.3%	8.2%
	9	EB US 50 Mainline b/w Connectors from I-5 and 10th St	Mainline	7.7%	7.6%	7.7%	7.6%	7.7%	7.7%	7.5%	7.6%	7.5%	7.5%	7.5%	7.6%	7.5%
	10	EB US 50 On-Ramp from 10th St-X St	On-Ramp	8.0%	7.8%	7.7%	7.8%	7.8%	7.9%	7.7%	7.8%	7.4%	7.7%	7.4%	7.8%	7.5%
	11	EB US 50 Mainline b/w 10th St and 15th St	Mainline	7.7%	7.6%	7.7%	7.6%	7.7%	7.6%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
	12	EB US 50 Off-Ramp to 15th St - X St	Off-Ramp	1.9%	2.0%	1.9%	2.0%	1.9%	2.0%	2.0%	2.1%	1.9%	1.9%	2.1%	2.0%	2.0%
	13	EB US 50 Mainline b/w 15th St & 16th St	Mainline	7.2%	7.2%	7.2%	7.2%	7.3%	7.2%	7.1%	7.1%	7.1%	7.1%	7.1%	7.1%	7.1%
	14	EB US 50 On-Ramp from 16th St - X St	On-Ramp	3.1%	3.3%	3.2%	3.2%	3.2%	3.3%	3.3%	3.2%	3.3%	3.2%	3.0%	3.2%	3.1%
	15	EB US 50 Mainline b/w 16th St & Connectors to SR 51 & 99	Mainline	7.0%	6.9%	7.0%	6.9%	7.0%	6.9%	6.8%	6.9%	6.9%	6.8%	6.8%	6.8%	6.8%
	16	EB US 50 to NB SR 51 Connector	Connector	6.9%	6.9%	6.9%	6.9%	7.0%	6.9%	6.7%	6.7%	7.0%	6.8%	6.7%	7.0%	6.8%
	17	EB US 50 to SB SR 99 Connector	Connector	6.9%	6.9%	7.0%	6.9%	7.0%	6.9%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.9%
	18	EB US 50 Mainline b/w Connectors to SR 51 & 99 and 26th St On	Mainline	7.0%	6.9%	7.0%	6.9%	7.0%	7.0%	6.9%	6.9%	6.9%	6.8%	6.8%	6.8%	6.8%
	19	EB US 50 On-Ramp from 26th St-X St	On-Ramp	1.8%	2.2%	2.1%	2.0%	2.1%	2.3%	1.9%	2.1%	1.9%	2.1%	1.9%	2.0%	1.9%
	20	EB US 50 Mainline b/w 26th St On and 34th St Off	Mainline	6.5%	6.5%	6.6%	6.5%	6.6%	6.6%	6.4%	6.5%	6.5%	6.4%	6.4%	6.4%	6.3%
	21	EB US 50 Off-Ramp to 34th St	Off-Ramp	6.4%	6.6%	6.4%	6.4%	6.4%	6.6%	6.4%	6.3%	6.5%	6.4%	6.4%	6.1%	6.4%
	22	EB US 50 Mainline b/w 34th St and Connectors from SR 51 & 99	Mainline	6.5%	6.5%	6.6%	6.5%	6.6%	6.6%	6.4%	6.5%	6.5%	6.5%	6.4%	6.4%	6.3%
	23	SB SR 51 to EB US 50 Connector	Connector	3.8%	3.8%	3.8%	3.8%	3.7%	4.0%	3.8%	3.8%	3.8%	3.8%	3.9%	3.9%	3.9%
	24	NB SR 99 to EB US 50 Connector	Connector	3.3%	3.3%	3.5%	3.4%	3.4%	3.4%	3.2%	3.4%	3.2%	3.3%	3.3%	3.4%	3.4%
	25	EB US 50 Mainline b/w Connectors from SR 51 & 99 and Stockton Blvd	Mainline	5.6%	5.6%	5.6%	5.6%	5.6%	5.7%	5.5%	5.6%	5.5%	5.5%	5.5%	5.6%	5.5%
	26	EB US 50 On-Ramp from Stockton Blvd	On-Ramp	2.2%	2.4%	2.2%	2.5%	2.2%	2.4%	2.4%	2.2%	2.3%	2.2%	2.3%	2.4%	2.3%
	27	EB US 50 Mainline b/w Stockton Blvd and 59th St	Mainline	5.4%	5.4%	5.4%	5.4%	5.4%	5.5%	5.3%	5.4%	5.3%	5.3%	5.3%	5.4%	5.3%
	28	EB US 50 Off-Ramp from 59th St	Off-Ramp	5.4%	5.5%	5.5%	5.3%	5.4%	5.5%	5.3%	5.4%	5.3%	5.4%	5.4%	5.3%	5.4%
	29	EB US 50 Mainline b/w 59th St and 65th St	Mainline	5.4%	5.4%	5.4%	5.4%	5.4%	5.5%	5.3%	5.4%	5.3%	5.3%	5.3%	5.4%	5.3%
	30	EB US 50 Off-Ramp to 65th St	Off-Ramp	5.1%	5.4%	5.4%	5.2%	5.2%	5.4%	5.3%	5.5%	5.1%	5.4%	5.3%	5.3%	5.2%
	31	EB US 50 Mainline b/w 65th St Off and 65th St Loop On	Mainline	5.4%	5.4%	5.4%	5.4%	5.4%	5.5%	5.3%	5.4%	5.4%	5.3%	5.3%	5.4%	5.3%
	32	EB US 50 Loop On-Ramp from SB 65th St	Off-Ramp	3.0%	2.9%	3.2%	3.1%	3.1%	3.0%	2.9%	2.9%	2.9%	2.9%	2.9%	3.0%	2.9%
	33	EB US 50 Mainline b/w 65th St Loop On and 65th St On	Mainline	5.2%	5.2%	5.3%	5.3%	5.3%	5.3%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
	34	EB US 50 On-Ramp from NB 65th St	On-Ramp	1.8%	1.8%	1.8%	1.9%	1.8%	2.0%	1.7%	2.1%	1.6%	1.8%	1.9%	1.8%	1.9%
	35	EB US 50 Mainline b/w 65th St and Howe Ave / Hornet Dr	Mainline	5.0%	5.0%	5.0%	5.0%	5.0%	5.1%	4.9%	5.0%	4.9%	4.9%	4.9%	5.0%	4.9%
	36	EB US 50 Off-Ramp to Hornet Dr	Off-Ramp	4.7%	4.6%	4.7%	4.8%	4.9%	4.8%	4.7%	4.9%	4.6%	4.7%	4.5%	5.0%	4.7%
	37	EB US 50 Off-Ramp to Howe Ave	Off-Ramp	5.0%	5.0%	5.2%	5.0%	5.1%	5.2%	5.0%	5.0%	4.9%	4.9%	5.0%	5.0%	4.8%
	38	EB US 50 Mainline b/w Howe Ave Off and Howe Ave Loop On	Mainline	5.0%	5.0%	5.0%	5.1%	5.0%	5.1%	4.9%	5.0%	5.0%	4.9%	4.9%	5.0%	4.9%
	39	EB US 50 Loop On-Ramp from SB Howe Ave	On-Ramp	4.4%	4.2%	4.4%	4.4%	4.3%	4.3%	4.4%	4.3%	4.3%	4.2%	4.1%	4.5%	4.3%
	40	EB US 50 Mainline b/w Howe Ave Loop On and Howe Ave On	Mainline	4.9%	4.9%	4.9%	5.0%	4.9%	5.0%	4.8%	4.9%	4.9%	4.8%	4.8%	4.9%	4.8%
	41	EB US 50 On-Ramp from NB Howe Ave	On-Ramp	7.7%	8.2%	8.3%	7.9%	8.2%	7.8%	8.3%	8.3%	8.2%	8.2%	7.9%	8.3%	8.5%
	42	EB US 50 Mainline b/w Howe Ave and Watt Ave	Mainline	5.1%	5.1%	5.1%	5.1%	5.1%	5.1%	5.0%	5.1%	5.1%	5.0%	5.0%	5.1%	5.0%
	43	EB US 50 Slip Off-Ramp to SB Watt Ave	Off-Ramp	5.1%	5.0%	5.2%	5.0%	5.0%	5.0%	4.9%	5.2%	5.0%	5.1%	4.7%	5.1%	5.1%
	44	EB US 50 Loop Off-Ramp to NB Watt Ave	Off-Ramp	5.0%	5.0%	5.0%	5.3%	5.1%	5.1%	5.1%	5.0%	5.2%	4.9%	5.0%	5.1%	5.0%
	45	EB US 50 Mainline b/w Watt Ave Off/On Ramps	Mainline	5.1%	5.1%	5.1%	5.1%	5.1%	5.2%	5.0%	5.1%	5.0%	5.1%	5.0%	5.1%	5.0%
	46	EB US 50 Loop On-Ramp from SB Watt Ave	On-Ramp	3.3%	3.5%	3.6%	3.4%	3.6%	3.5%	3.4%	3.5%	3.4%	3.4%	3.6%	3.5%	3.5%
	47	EB US 50 Slip On-Ramp to NB Watt Ave	On-Ramp	6.7%	6.9%	6.7%	7.1%	6.8%	6.6%	6.9%	6.5%	6.8%	6.9%	6.8%	7.0%	6.9%
	48	EB US 50 Mainline b/w Watt Ave and Bradshaw Rd	Mainline	4.9%	5.0%	5.0%	5.0%	5.0%	5.0%	4.9%	4.9%	4.9%	4.9%	4.9%	5.0%	4.9%

WB	1	WB Mainline b/w Watt Ave and Bradshaw Rd	Mainline	3.8%	3.7%	3.6%	3.8%	3.6%	3.7%	3.7%	3.8%	3.7%	3.8%	3.7%	3.7%	3.8%
	2	WB Slip Off-Ramp to NB Watt Ave	Off-Ramp	3.7%	3.6%	3.5%	3.7%	3.6%	3.6%	3.6%	3.7%	3.7%	3.6%	3.5%	3.6%	3.6%
	3	WB Loop Off-Ramp to SB Watt Ave	Off-Ramp	3.9%	3.7%	3.6%	4.0%	3.8%	3.8%	3.9%	4.0%	3.9%	3.8%	3.9%	3.9%	3.9%
	4	WB Mainline b/w Watt Ave Off/On Ramps	Mainline	3.8%	3.7%	3.6%	3.8%	3.6%	3.7%	3.7%	3.7%	3.7%	3.8%	3.7%	3.7%	3.8%
	5	WB Loop On-Ramp from NB Watt Ave	On-Ramp	6.2%	6.2%	6.1%	6.2%	6.0%	6.2%	6.1%	6.2%	6.3%	6.3%	6.1%	6.3%	6.3%
	6	WB Mainline b/w Watt Ave Loop On and Watt Ave Slip On	Mainline	4.1%	4.0%	4.0%	4.1%	3.9%	4.1%	4.0%	4.1%	4.1%	4.2%	4.0%	4.0%	4.2%
	7	WB Slip On-Ramp from SB Watt Ave	On-Ramp	3.4%	3.3%	3.4%	3.4%	3.4%	3.3%	3.3%	3.4%	3.3%	3.3%	3.3%	3.4%	3.4%
	8	WB Mainline b/w Watt Ave and Howe Ave	Mainline	4.0%	4.0%	3.9%	4.0%	3.9%	4.0%	4.0%	4.0%	4.0%	4.0%	3.9%	4.0%	4.0%
	9	WB Off-Ramp to Howe Ave	Off-Ramp	4.1%	4.0%	3.9%	4.0%	3.9%	4.0%	3.9%	4.0%	4.0%	4.0%	4.0%	4.1%	4.1%
	10	WB Mainline b/w Howe Ave Off and Howe Ave On	Mainline	4.0%	4.0%	3.9%	4.0%	3.9%	4.0%	4.0%	4.0%	3.9%	4.0%	3.9%	3.9%	4.0%
	11	WB Loop On-Ramp from NB Howe Ave	On-Ramp	6.3%	6.2%	6.7%	6.3%	6.8%	6.3%	6.7%	6.3%	6.6%	6.5%	6.8%	6.6%	6.5%
	12	WB Mainine b/w Howe Ave Loop On and Howe Ave Slip On	Mainline	4.2%	4.1%	4.1%	4.2%	4.1%	4.1%	4.2%	4.2%	4.1%	4.2%	4.1%	4.1%	4.2%
	13	WB Slip On-Ramp from SB Howe Ave	On-Ramp	4.3%	4.2%	4.4%	4.4%	4.4%	4.2%	4.2%	4.3%	4.2%	4.3%	4.2%	4.3%	4.3%
	14	WB Mainline b/w Howe Ave and Hornet Dr	Mainline	4.2%	4.1%	4.1%	4.2%	4.1%	4.1%	4.1%	4.2%	4.1%	4.2%	4.1%	4.1%	4.1%
	15	WB On-Ramp from Hornet Dr	On-Ramp	4.4%	4.7%	4.6%	4.4%	4.6%	4.4%	4.5%	4.4%	4.5%	4.5%	4.7%	4.6%	4.8%
	16	WB Mainline b/w Hornet Dr and 65th St	Mainline	4.1%	4.1%	4.1%	4.1%	4.0%	4.1%	4.1%	4.1%	4.0%	4.1%	4.1%	4.1%	4.1%
	17	WB Off-Ramp to 65th St	Off-Ramp	4.1%	4.0%	4.0%	4.1%	4.1%	4.1%	4.1%	4.1%	4.0%	4.1%	3.9%	4.0%	4.0%
	18	WB Mainline b/w 65th St Off and 65th St Loop On	Mainline	4.1%	4.1%	4.1%	4.1%	4.0%	4.1%	4.1%	4.1%	4.0%	4.1%	4.1%	4.1%	4.1%
	19	WB Loop On-Ramp from NB 65th St	On-Ramp	2.1%	2.5%	2.4%	2.4%	2.3%	2.4%	2.1%	2.5%	2.1%	2.1%	2.0%	2.2%	2.4%
	20	WB Mainline b/w 65th St Loop On and 65th St Slip On	Mainline	4.0%	4.0%	4.0%	4.1%	4.0%	4.0%	4.0%	4.1%	4.0%	4.0%	4.0%	4.1%	4.0%
	21	WB Slip On-Ramp from SB 65th St	On-Ramp	1.6%	1.8%	1.8%	1.7%	1.7%	1.8%	1.8%	1.7%	1.6%	1.6%	1.8%	1.9%	1.8%
	22	WB Mainline b/w 65th St and 59th St	Mainline	4.0%	4.0%	3.9%	4.0%	3.9%	3.9%	4.0%	4.0%	3.9%	3.9%	4.0%	4.0%	3.9%
	23	WB On-Ramp from 59th St	On-Ramp	2.4%	2.7%	2.6%	2.6%	2.6%	2.6%	2.5%	2.5%	2.5%	2.5%	2.5%	2.6%	2.5%
	24	WB Mainline b/w 59th St and Stockton Blvd	Mainline	3.9%	3.9%	3.9%	3.9%	3.8%	3.8%	3.9%	3.9%	3.8%	3.9%	3.9%	3.9%	3.8%
	25	WB Off-Ramp to Stockton Blvd	Off-Ramp	3.7%	3.7%	3.8%	3.8%	3.7%	3.6%	3.9%	3.8%	3.7%	3.8%	3.8%	3.9%	3.8%
	26	WB Mainline b/w Stockton Blvd Off/On Ramps	Mainline	3.9%	3.9%	3.9%	3.9%	3.8%	3.8%	4.1%	4.4%	3.8%	3.9%	4.1%	4.5%	3.8%
	27	WB On-Ramp from Stockton Blvd	On-Ramp	1.7%	1.9%	1.8%	2.0%	1.8%	1.8%	1.8%	1.8%	1.8%	1.6%	1.7%	1.8%	1.7%
	28	WB Mainline b/w Stockton Blvd and Connectors to SR 51 & 99	Mainline	3.7%	3.7%	3.7%	3.8%	3.7%	3.7%	3.7%	3.7%	3.6%	3.7%	3.7%	3.8%	3.7%
	29	WB US 50 to NB SR 51 Connector	Connector	3.7%	3.8%	3.8%	3.8%	3.7%	3.8%	3.8%	3.6%	3.7%	3.7%	3.9%	3.9%	3.7%
	30	WB Mainline b/w Connectors to SR 51 and SR 99	Mainline	3.7%	3.7%	3.7%	3.8%	3.7%	3.7%	3.7%	3.7%	3.6%	3.7%	3.7%	3.8%	3.7%
	31	WB US 50 to SB SR 99 Connector	Connector	3.8%	3.7%	3.8%	3.8%	3.7%	3.7%	3.7%	3.7%	3.6%	3.7%	3.6%	3.8%	3.7%
	32	WB Mainline b/w Connector to SR 99 and 26th St Off	Mainline	3.7%	3.7%	3.7%	3.8%	3.6%	3.7%	3.7%	3.7%	3.6%	3.6%	3.7%	3.8%	3.7%
	33	WB Off-Ramp to 26th St - W St	Off-Ramp	3.7%	3.5%	3.7%	3.8%	3.5%	3.6%	3.7%	3.8%	3.6%	3.6%	3.8%	3.8%	3.6%
	34	WB Mainline b/w 26th St and Connectors from SR 51 & 99	Mainline	3.7%	3.8%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.6%	3.6%	3.7%	3.8%	3.7%
	35	NB SR 99 to WB US 50 Connector	Connector	3.3%	3.3%	3.2%	3.3%	3.3%	3.2%	3.2%	3.3%	3.2%	3.2%	3.3%	3.3%	3.2%
	36	WB Mainline b/w Connectors from SR 99 & SR 51	Mainline	3.6%	3.7%	3.6%	3.6%	3.6%	3.6%	3.6%	3.7%	3.5%	3.5%	3.7%	3.7%	3.6%
	37	SB SR 51 to WB US 50 Connector	Connector	3.5%	3.6%	3.5%	3.5%	3.5%	3.6%	3.5%	3.5%	3.5%	3.5%	3.6%	3.4%	3.6%
	38	WB Mainline b/w Connectors from SR 51 & 99 and 16th St	Mainline	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.5%	3.5%	3.7%	3.7%	3.6%
	39	WB Off-Ramp to 16th St - W St	Off-Ramp	3.6%	3.7%	3.6%	3.6%	3.5%	3.5%	3.6%	3.5%	3.6%	3.4%	3.4%	3.7%	3.6%
	40	WB Mainline b/w 16th St and 15th St	Mainline	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.6%	3.5%	3.5%	3.7%	3.7%	3.6%
	41	WB Off-Ramp to 10th St-W St	Off-Ramp	3.7%	3.8%	3.7%	3.7%	3.6%	3.8%	3.6%	3.8%	3.7%	3.6%	3.8%	3.9%	3.8%
	42	WB Mainline b/w 10th St Off and 15th St On	Mainline	3.6%	3.6%	3.6%	3.6%	3.5%	3.6%	3.6%	3.6%	3.5%	3.5%	3.7%	3.7%	3.6%
	43	WB On-Ramp from 15th St - W St	On-Ramp	2.1%	2.2%	2.2%	2.1%	2.2%	2.1%	2.2%	2.2%	2.1%	2.0%	2.0%	2.2%	2.1%
	44	WB Mainline b/w 10th St and Connectors to I-5	Mainline	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.4%	3.4%	3.5%	3.5%	3.4%
	45	WB I-80/US 50 to NB I-5 Connector / Q St Off	Connector	3.4%	3.5%	3.5%	3.5%	3.4%	3.5%	3.5%	3.5%	3.4%	3.4%	3.4%	3.5%	3.5%
	46	WB I-80/US 50 to SB I-5 Connector	Connector	3.5%	3.6%	3.5%	3.6%	3.5%	3.6%	3.6%	3.5%	3.5%	3.5%	3.6%	3.7%	3.5%
	47	WB Mainline b/w Connectors to I-5 and 5th St	Mainline	3.5%	3.5%	3.4%	3.5%	3.4%	3.4%	3.5%	3.5%	3.4%	3.4%	3.6%	3.5%	3.4%
	48	WB On-Ramp from 5th St / W St	On-Ramp	1.9%	1.9%	1.9%	2.0%	1.9%	1.9%	1.9%	1.9%	1.9%	2.0%	1.9%	1.9%	1.9%
	49	WB Mainline b/w 5th St and Connectors from I-5	Mainline	3.4%	3.4%	3.3%	3.4%	3.3%	3.3%	3.3%	3.4%	3.2%	3.3%	3.4%	3.4%	3.3%
	50	SB I-5 to WB I-80/US 50 Connector	Connector	8.2%	8.2%	8.1%	8.2%	8.1%	8.0%	8.0%	8.0%	7.9%	7.8%	8.0%	7.8%	7.7%
	51	NB I-5 to WB I-80/US 50 Connector	Connector	5.8%	5.6%	5.7%	5.7%	5.8%	5.7%	5.7%	5.8%	5.6%	5.7%	5.8%	5.7%	5.8%
	52	WB Mainline b/w Connectors from I-5 and Jefferson Blvd	Mainline	4.3%	4.3%	4.2%	4.3%	4.2%	4.2%	4.2%	4.2%	4.1%	4.1%	4.3%	4.2%	4.1%

Note: vpp = vehicles per period
All results reported from up to ten VISSIM microsimulation model runs (per scenario).

Summary (Average Truck Percentage):

EB Average	5.5%	5.6%	5.6%	5.6%	5.6%	5.6%	5.5%	5.6%	5.5%	5.5%	5.5%	5.6%	5.5%
WB Average	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%
Total Average	**4.6%**	**4.7%**	**4.7%**	**4.7%**	**4.6%**	**4.7%**	**4.6%**	**4.7%**	**4.6%**	**4.6%**	**4.6%**	**4.7%**	**4.6%**

APPENDIX B

Average Daily Mainline VMT Speed Distibution
US 50 Corridor - Option 1

Speed Bin (mph)	Mainline VMT Speed Distribution - Quantity												
	Year 2013 No Project	Year 2020 No Project	Year 2020 Add HOV Lane	Year 2020 Add Mixed Flow Lane	Year 2020 Take-a-Lane	Year 2030 No Project	Year 2030 Add HOV Lane	Year 2030 Add Mixed Flow Lane	Year 2030 Take-a-Lane	Year 2040 No Project	Year 2040 Add HOV Lane	Year 2040 Add Mixed Flow Lane	Year 2040 Take-a-Lane
0 - 5	0	0	0	0	0	0	0	0	0	0	0	0	0
5-10	0	0	0	0	0	0	0	0	0	0	0	0	0
10-15	0	0	0	0	0	0	0	0	0	0	0	0	0
15 -20	0	0	0	0	0	0	0	0	0	0	0	0	0
20 - 25	0	0	0	0	0	55,074	93,513	93,547	36,345	35,512	35,993	35,997	35,510
25 - 30	0	0	0	0	0	110,155	87,151	87,203	128,912	74,009	94,389	94,423	70,255
30 - 35	27,119	61,722	91,199	99,042	61,673	65,363	33,405	79,176	34,756	182,468	70,752	172,175	58,465
35 - 40	110,383	172,303	62,283	102,881	74,545	421,723	12,238	224,125	119,535	671,652	79,323	247,001	234,851
40 - 45	146,401	299,131	38,373	160,186	148,680	501,539	118,713	222,046	285,094	524,791	208,280	360,905	390,786
45 - 50	403,295	454,795	169,553	291,216	331,731	512,432	376,725	408,664	488,479	395,214	521,834	455,423	565,791
50 - 55	408,607	326,881	383,102	446,401	455,506	282,857	536,606	429,315	525,379	329,463	447,610	404,941	521,896
55 - 60	273,897	460,422	429,600	333,023	366,297	258,859	538,184	389,685	318,730	198,181	561,868	334,806	397,535
60 - 65	551,991	330,475	763,354	581,476	621,290	202,861	651,361	482,416	555,090	112,112	613,939	476,136	322,639
65+	57,587	42,076	353,144	200,418	152,057	8,594	164,426	102,379	15,820	0	106,852	50,303	16,007
TOTAL	1,979,279	2,147,805	2,290,609	2,214,643	2,211,781	2,419,456	2,612,322	2,518,556	2,508,140	2,523,402	2,740,841	2,632,110	2,613,734

Average Daily Mainline VMT Speed Distibution
US 50 Corridor - Option 1

Speed Bin (mph)	Mainline VMT Speed Distribution - Percentage												
	Year 2013 No Project	Year 2020 No Project	Year 2020 Add HOV Lane	Year 2020 Add Mixed Flow Lane	Year 2020 Take-a-Lane	Year 2030 No Project	Year 2030 Add HOV Lane	Year 2030 Add Mixed Flow Lane	Year 2030 Take-a-Lane	Year 2040 No Project	Year 2040 Add HOV Lane	Year 2040 Add Mixed Flow Lane	Year 2040 Take-a-Lane
0 - 5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5-10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
10-15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15 -20	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
20 - 25	0%	0%	0%	0%	0%	2%	4%	4%	1%	1%	1%	1%	1%
25 - 30	0%	0%	0%	0%	0%	5%	3%	3%	5%	3%	3%	4%	3%
30 - 35	1%	3%	4%	4%	3%	3%	1%	3%	1%	7%	3%	7%	2%
35 - 40	6%	8%	3%	5%	3%	17%	0%	9%	5%	27%	3%	9%	9%
40 - 45	7%	14%	2%	7%	7%	21%	5%	9%	11%	21%	8%	14%	15%
45 - 50	20%	21%	7%	13%	15%	21%	14%	16%	19%	16%	19%	17%	22%
50 - 55	21%	15%	17%	20%	21%	12%	21%	17%	21%	13%	16%	15%	20%
55 - 60	14%	21%	19%	15%	17%	11%	21%	15%	13%	8%	20%	13%	15%
60 - 65	28%	15%	33%	26%	28%	8%	25%	19%	22%	4%	22%	18%	12%
65+	3%	2%	15%	9%	7%	0%	6%	4%	1%	0%	4%	2%	1%

APPENDIX C

Year 2020 No Project Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**56.1**	**E**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	12.7	B
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**>80**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	23.0	C
5	5th St & I-80 EB On-Ramp	Yield	2.0	A
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	33.7	C
7	I-5 SB Ramps & Sutterville Rd	AWSC	16.0	B
8	I-5 NB Ramps & Sutterville Rd	TWSC	13.5	B
9	I-5 NB Off-Ramp & Broadway	TWSC	2.3	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	54.9	D
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**72.7**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	2.1	A
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**70.4**	**E**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	32.9	C
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	40.6	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**68.6**	**E**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**62.0**	**E**
21	16th St & X St & US 50 EB On-Ramp	Signal	37.4	D
22	16th St & US 50 WB Off-Ramp & W St	Signal	**60.2**	**E**
23	26th St & W St & US 50 WB Off-Ramp	Signal	29.8	C
24	27th St & X St & US 50 EB On-Ramp	TWSC	30.1	D
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	49.0	D
27	SR 99 SB On-Ramp & Broadway	Yield	3.4	A
28	SR 99 NB Off-Ramp & Broadway	Signal	26.8	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	40.8	D
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	49.8	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**69.2**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	41.7	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**72.4**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	45.5	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	3.9	A
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	41.5	D
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	29.4	C
40	65th St & S St/US 50 WB Ramps	Signal	**70.4**	**E**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.4	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	2.1	A
43	Howe Ave & US 50 EB Ramps	Signal	30.4	C
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**70.6**	**E**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	51.8	D
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	16.2	B
			Failing Intersections:	**15**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2020 Add HOV Lane Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**57.2**	**E**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	14.7	B
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**>80**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	25.3	D
5	5th St & I-80 EB On-Ramp	Yield	2.0	A
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	35.0	C
7	I-5 SB Ramps & Sutterville Rd	AWSC	15.9	B
8	I-5 NB Ramps & Sutterville Rd	TWSC	10.6	B
9	I-5 NB Off-Ramp & Broadway	TWSC	2.3	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**56.2**	**E**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**72.2**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	2.6	A
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**>80**	**F**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	**73.2**	**E**
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	51.3	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**71.6**	**E**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**70.0**	**E**
21	16th St & X St & US 50 EB On-Ramp	Signal	37.7	D
22	16th St & US 50 WB Off-Ramp & W St	Signal	**58.5**	**E**
23	26th St & W St & US 50 WB Off-Ramp	Signal	29.3	C
24	27th St & X St & US 50 EB On-Ramp	TWSC	33.4	D
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	13.7	B
28	SR 99 NB Off-Ramp & Broadway	Signal	27.7	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	40.5	D
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	49.1	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**68.6**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	41.1	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**74.1**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	45.5	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	4.7	A
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	43.8	D
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	29.4	C
40	65th St & S St/US 50 WB Ramps	Signal	**72.5**	**E**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.5	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	2.1	A
43	Howe Ave & US 50 EB Ramps	Signal	29.3	C
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**69.7**	**E**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	53.1	D
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	17.0	B
			Failing Intersections:	**18**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2030 No Project Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**60.4**	**E**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	23.2	C
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**>80**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	28.5	D
5	5th St & I-80 EB On-Ramp	Yield	2.0	A
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	34.6	C
7	I-5 SB Ramps & Sutterville Rd	AWSC	17.3	B
8	I-5 NB Ramps & Sutterville Rd	TWSC	51.4	**F**
9	I-5 NB Off-Ramp & Broadway	TWSC	13.6	B
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**>80**	**F**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**78.4**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	26.3	D
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**>80**	**F**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	35.8	D
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	40.7	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**>80**	**F**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**>80**	**F**
21	16th St & X St & US 50 EB On-Ramp	Signal	46.2	D
22	16th St & US 50 WB Off-Ramp & W St	Signal	**66.3**	**E**
23	26th St & W St & US 50 WB Off-Ramp	Signal	30.3	C
24	27th St & X St & US 50 EB On-Ramp	TWSC	31.8	D
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	3.5	A
28	SR 99 NB Off-Ramp & Broadway	Signal	27.1	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	40.5	D
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	51.3	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**68.6**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	41.8	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**72.8**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	44.8	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	42.8	**E**
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	**>80**	**F**
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	32.9	C
40	65th St & S St/US 50 WB Ramps	Signal	**>80**	**F**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.5	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	2.6	A
43	Howe Ave & US 50 EB Ramps	Signal	**>80**	**F**
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**>80**	**F**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	**76.9**	**E**
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	20.8	C
			Failing Intersections:	**22**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2030 Add HOV Lane Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**66.7**	**E**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	26.4	C
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**>80**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	43.6	**E**
5	5th St & I-80 EB On-Ramp	Yield	2.0	A
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	34.6	C
7	I-5 SB Ramps & Sutterville Rd	AWSC	17.8	B
8	I-5 NB Ramps & Sutterville Rd	TWSC	26.6	D
9	I-5 NB Off-Ramp & Broadway	TWSC	2.4	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**61.5**	**E**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**74.2**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	**62.9**	**F**
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**>80**	**F**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	41.6	D
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	43.9	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**>80**	**F**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**>80**	**F**
21	16th St & X St & US 50 EB On-Ramp	Signal	**56.0**	**E**
22	16th St & US 50 WB Off-Ramp & W St	Signal	**>80**	**F**
23	26th St & W St & US 50 WB Off-Ramp	Signal	30.9	C
24	27th St & X St & US 50 EB On-Ramp	TWSC	35.3	**E**
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	3.7	A
28	SR 99 NB Off-Ramp & Broadway	Signal	28.5	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	41.4	D
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	50.6	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**67.5**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	42.2	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**74.6**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	45.4	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	**>80**	**F**
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	**>80**	**F**
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	34.4	C
40	65th St & S St/US 50 WB Ramps	Signal	**>80**	**F**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.6	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	7.8	A
43	Howe Ave & US 50 EB Ramps	Signal	**>80**	**F**
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**>80**	**F**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	**>80**	**F**
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	35.5	D
			Failing Intersections:	**25**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2040 No Project Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**>80**	**F**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	33.4	C
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	52.6	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	**>80**	**F**
5	5th St & I-80 EB On-Ramp	Yield	2.1	A
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	38.6	D
7	I-5 SB Ramps & Sutterville Rd	AWSC	14.0	B
8	I-5 NB Ramps & Sutterville Rd	TWSC	**>80**	**F**
9	I-5 NB Off-Ramp & Broadway	TWSC	2.5	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**>80**	**F**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**80.0**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	2.1	A
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**79.3**	**E**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	**>80**	**F**
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	48.1	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**>80**	**F**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**>80**	**F**
21	16th St & X St & US 50 EB On-Ramp	Signal	47.5	D
22	16th St & US 50 WB Off-Ramp & W St	Signal	**>80**	**F**
23	26th St & W St & US 50 WB Off-Ramp	Signal	37.3	D
24	27th St & X St & US 50 EB On-Ramp	TWSC	16.9	C
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	47.4	**E**
28	SR 99 NB Off-Ramp & Broadway	Signal	26.1	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	34.7	C
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	50.8	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**66.8**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	43.0	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**76.5**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	43.3	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	**>80**	**F**
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	**>80**	**F**
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	15.7	B
40	65th St & S St/US 50 WB Ramps	Signal	**>80**	**F**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.1	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	6.5	A
43	Howe Ave & US 50 EB Ramps	Signal	**>80**	**F**
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**>80**	**F**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	17.1	B
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	**>80**	**F**
			Failing Intersections:	**25**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2040 Add HOV Lane Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**>80**	**F**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	42.0	D
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**69.5**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	**>80**	**F**
5	5th St & I-80 EB On-Ramp	Yield	7.4	A
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	39.6	D
7	I-5 SB Ramps & Sutterville Rd	AWSC	3.6	A
8	I-5 NB Ramps & Sutterville Rd	TWSC	**>80**	**F**
9	I-5 NB Off-Ramp & Broadway	TWSC	2.6	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**>80**	**F**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**79.2**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	2.1	A
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**>80**	**F**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	**>80**	**F**
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	46.6	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**>80**	**F**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**>80**	**F**
21	16th St & X St & US 50 EB On-Ramp	Signal	**56.9**	**E**
22	16th St & US 50 WB Off-Ramp & W St	Signal	**>80**	**F**
23	26th St & W St & US 50 WB Off-Ramp	Signal	38.7	D
24	27th St & X St & US 50 EB On-Ramp	TWSC	18.7	C
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	12.6	B
28	SR 99 NB Off-Ramp & Broadway	Signal	27.6	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	35.1	D
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	51.5	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**67.2**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	42.7	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**77.3**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	43.4	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	**>80**	**F**
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	**>80**	**F**
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	18.1	B
40	65th St & S St/US 50 WB Ramps	Signal	**>80**	**F**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.1	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	**>80**	**F**
43	Howe Ave & US 50 EB Ramps	Signal	**>80**	**F**
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**>80**	**F**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	**>80**	**F**
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	**>80**	**F**
			Failing Intersections:	**27**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2040 Add Mixed Flow Lane Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**>80**	**F**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	54.4	D
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**>80**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	**>80**	**F**
5	5th St & I-80 EB On-Ramp	Yield	27.5	D
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	39.9	D
7	I-5 SB Ramps & Sutterville Rd	AWSC	7.8	A
8	I-5 NB Ramps & Sutterville Rd	TWSC	**>80**	**F**
9	I-5 NB Off-Ramp & Broadway	TWSC	2.6	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**>80**	**F**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**79.4**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	2.1	A
15	5th St & X St & US 50 EB Off-Ramp	Signal	**>80**	**F**
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	**>80**	**F**
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	**>80**	**F**
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	48.0	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**>80**	**F**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**>80**	**F**
21	16th St & X St & US 50 EB On-Ramp	Signal	**68.0**	**E**
22	16th St & US 50 WB Off-Ramp & W St	Signal	**>80**	**F**
23	26th St & W St & US 50 WB Off-Ramp	Signal	39.5	D
24	27th St & X St & US 50 EB On-Ramp	TWSC	24.1	C
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	**74.1**	**F**
28	SR 99 NB Off-Ramp & Broadway	Signal	28.1	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	35.1	D
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	50.8	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**67.8**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	43.4	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**78.8**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	44.4	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	**>80**	**F**
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	**>80**	**F**
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	20.0	B
40	65th St & S St/US 50 WB Ramps	Signal	**>80**	**F**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	1.2	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	**>80**	**F**
43	Howe Ave & US 50 EB Ramps	Signal	**>80**	**F**
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**>80**	**F**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	16.7	B
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	**>80**	**F**
			Failing Intersections:	**27**

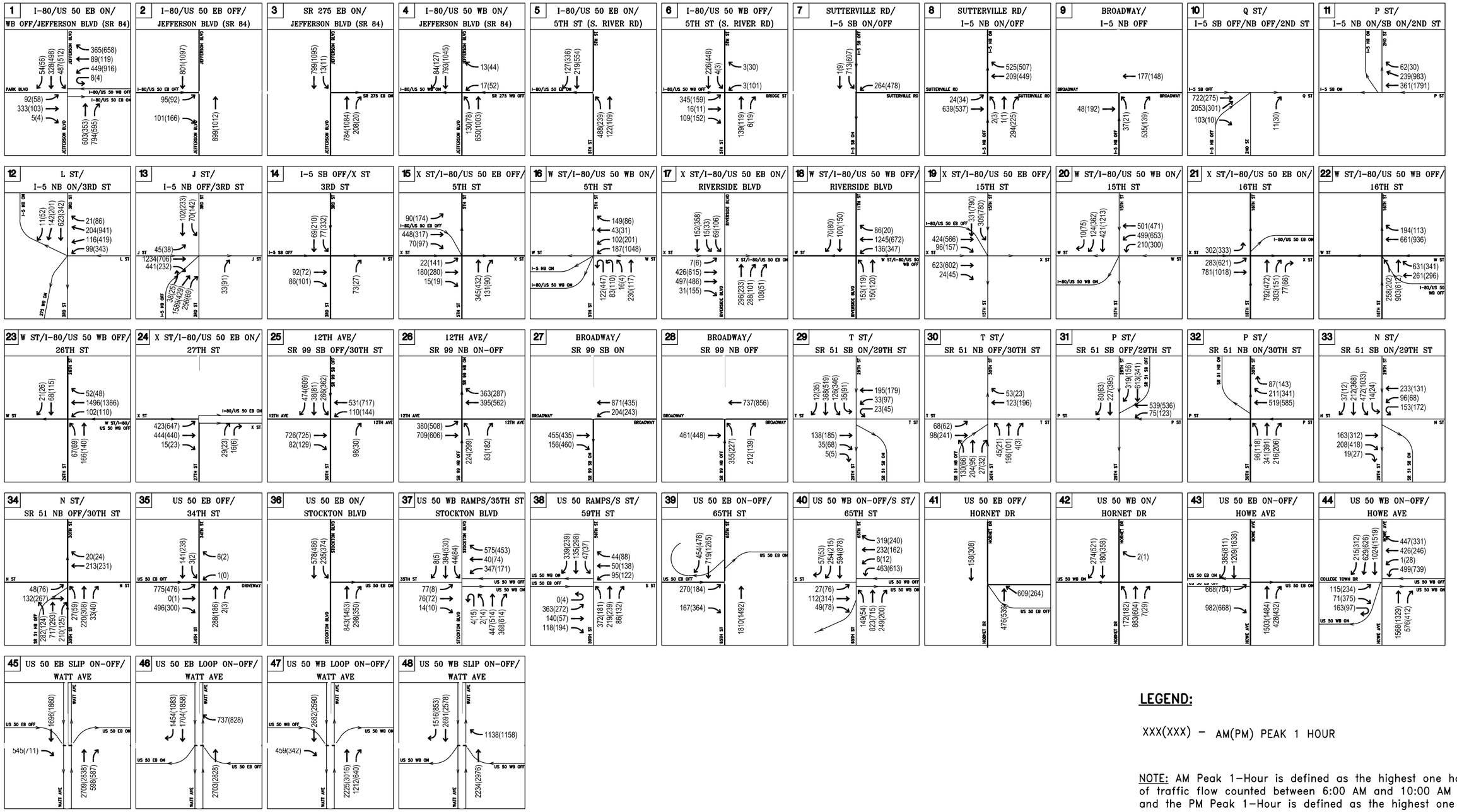
Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

Year 2040 Take-a-Lane Option 1
PM Peak Hour (4:30 PM to 5:30 PM) Ramp Intersection Delay and LOS
US 50 HOV Lane Project VISSIM Microsimulation Model

#	Intersection	Control	Delay (s/veh)	Level-of-Service (LOS)
1	Jefferson Blvd (SR 84) & I-80 EB On-Ramp & Park Blvd/I-80 WB Off-Ramp	Signal	**>80**	**F**
2	Jefferson Blvd (SR 84) & I-80 EB Off-Ramp	Signal	**>80**	**F**
3	Jefferson Blvd (SR 84) & SR 275 EB On-Ramp	Yield	**>80**	**F**
4	Jefferson Blvd (SR 84) & SR 275 WB Off/On-Ramps	TWSC	**>80**	**F**
5	5th St & I-80 EB On-Ramp	Yield	**>80**	**F**
6	5th St & I-80 WB Off-Ramp/Bridge St	Signal	36.9	D
7	I-5 SB Ramps & Sutterville Rd	AWSC	25.3	C
8	I-5 NB Ramps & Sutterville Rd	TWSC	**>80**	**F**
9	I-5 NB Off-Ramp & Broadway	TWSC	2.4	A
10	US 50/I-5 NB Off-Ramp & I-5 SB Off-Ramp/Q St	TWSC	0.0	A
11	I-5 SB On-Ramp/US 50/P St & I-5 NB On-Ramp & 2nd St	None	N/A	N/A
12	Capitol Mall/SR 275 On-Ramp & 3rd St & I-5 NB On-Ramp	Signal	**>80**	**F**
13	I-5 NB Off-Ramp & 3rd St & I-5 SB Off-Ramp/J St	Signal	**76.9**	**E**
14	3rd St & I-5 SB Off-Ramp/X St	TWSC	2.0	A
15	5th St & X St & US 50 EB Off-Ramp	Signal	39.9	D
16	US 50 WB/I-5 SB On-Ramp & 5th St & I-5 NB On-Ramp & W St	Signal	51.0	D
17	Riverside Blvd & X St & US 50 EB On-Ramp	Signal	**>80**	**F**
18	Riverside Blvd/11th St & W St/US 50 WB Off-Ramp	Signal	46.4	D
19	X St & US 50 EB Off-Ramp & 15th St	Signal	**>80**	**F**
20	US 50 WB On-Ramp & 15th St & W St	Signal	**>80**	**F**
21	16th St & X St & US 50 EB On-Ramp	Signal	**57.3**	**E**
22	16th St & US 50 WB Off-Ramp & W St	Signal	**>80**	**F**
23	26th St & W St & US 50 WB Off-Ramp	Signal	36.9	D
24	27th St & X St & US 50 EB On-Ramp	TWSC	19.0	C
25	30th St/SR 99 SB Off-Ramp & 12th Ave	Signal	**>80**	**F**
26	SR 99 NB Off-Ramp/SR 99 NB On-Ramp & 12th Ave	Signal	**>80**	**F**
27	SR 99 SB On-Ramp & Broadway	Yield	**>80**	**F**
28	SR 99 NB Off-Ramp & Broadway	Signal	29.0	C
29	29th St & SR 99 SB On-Ramp & T St	Signal	34.6	C
30	SR 99 NB Off-Ramp & 30th St & T St	Signal	52.7	D
31	29th St & P St & SR 51 SB Off-Ramp	Signal	**68.0**	**E**
32	30th St & P St & SR 51 NB On-Ramp	Signal	42.9	D
33	29th St & SR 51 NB On-Ramp & N St	Signal	**>80**	**F**
34	SR 51 SB Off-Ramp & 30th St & N St	Signal	**74.7**	**E**
35	34th St & US 50 EB/SR 51 SB Off-Ramp	Signal	43.2	D
36	Stockton Blvd & US 50 EB On-Ramp	Yield	**>80**	**F**
37	Stockton Blvd & US 50 WB Ramps & 35th St	Signal	**>80**	**F**
38	59th St & US 50 EB Off-Ramp/WB On-Ramp/S St	Signal	**>80**	**F**
39	65th St & US 50 EB Ramps	Signal	14.2	B
40	65th St & S St/US 50 WB Ramps	Signal	**>80**	**F**
41	Hornet Dr & US 50 EB Off-Ramp	Signal	0.0	A
42	Hornet Dr & US 50 WB On-Ramp	Yield	3.3	A
43	Howe Ave & US 50 EB Ramps	Signal	42.9	D
44	Howe Ave & College Town Dr/US 50 WB Off-Ramp	Signal	**>80**	**F**
45	Watt Ave & US 50 EB Direct On/Off-Ramps	Signal	17.5	B
46	Watt Ave & US 50 EB Loop On-Ramp	None	N/A	N/A
47	Watt Ave & US 50 WB Loop On-Ramp	None	N/A	N/A
48	Watt Ave & US 50 WB Direct On/Off-Ramps	Signal	**>80**	**F**
			Failing Intersections:	**25**

Level-of-Service (LOS) was calculated from Vissim reported turning-movement delays. The reported LOS is not directly equivalent to HCM LOS.
All results are average of up to10 model runs.

APPENDIX D



LEGEND:

XXX(XXX) – AM(PM) PEAK 1 HOUR

NOTE: AM Peak 1–Hour is defined as the highest one hour of traffic flow counted between 6:00 AM and 10:00 AM and the PM Peak 1–Hour is defined as the highest one hour of traffic flow counted between 3:00 PM and 7:00 PM.

DRAFT

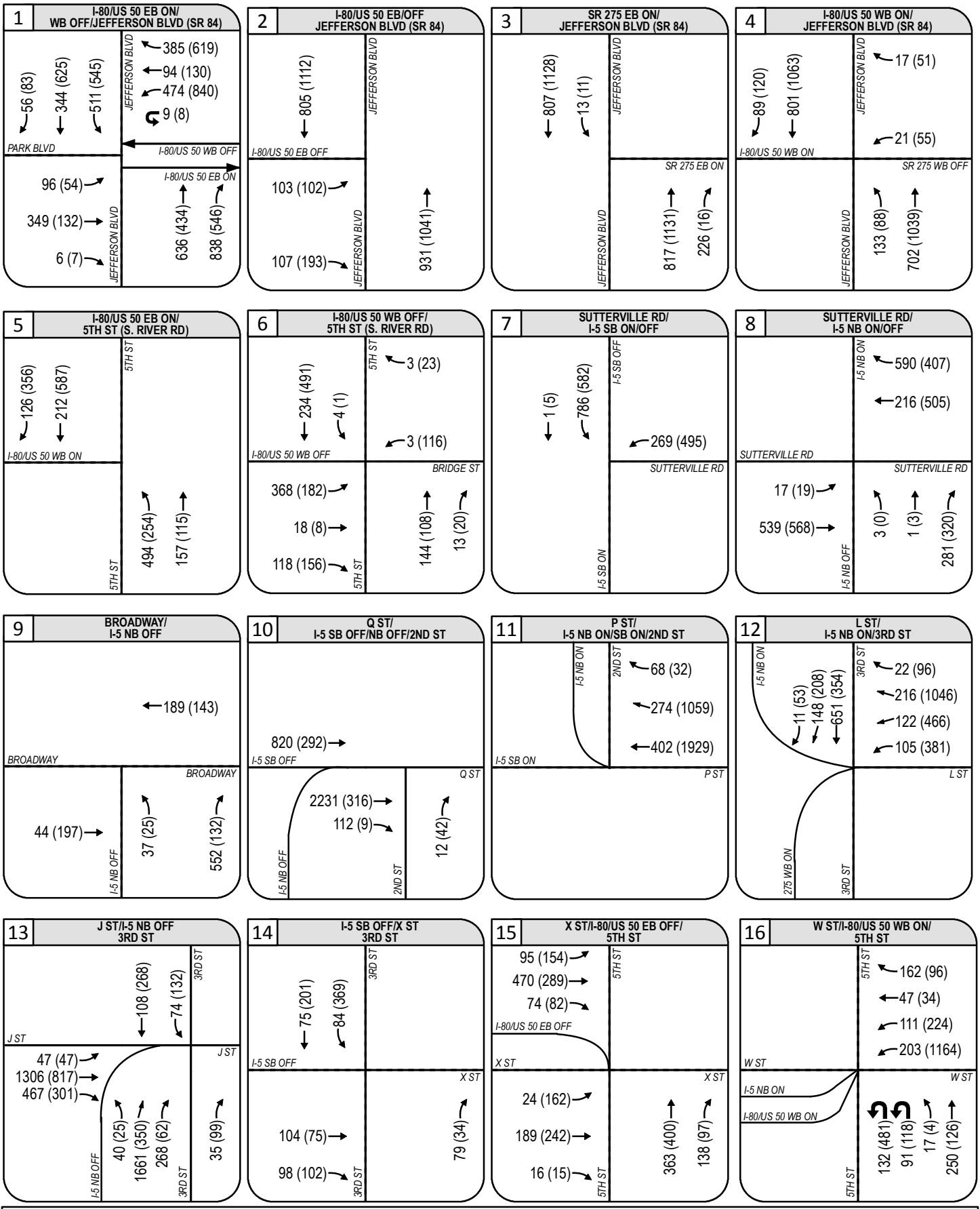
CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

EXISTING (2013) INTERSECTION PEAK 1-HOUR COUNTS - UNBALANCED

FIGURE 07

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
3301 C St, Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

J:\Jobs\8497-CT-D3-TrafficOps\001_US50_HOV\Traffic\Dwg\Figure_07_Existing_1_Hr_Vols.dwg 11/6/2013 10:16 AM Nowid Nessor

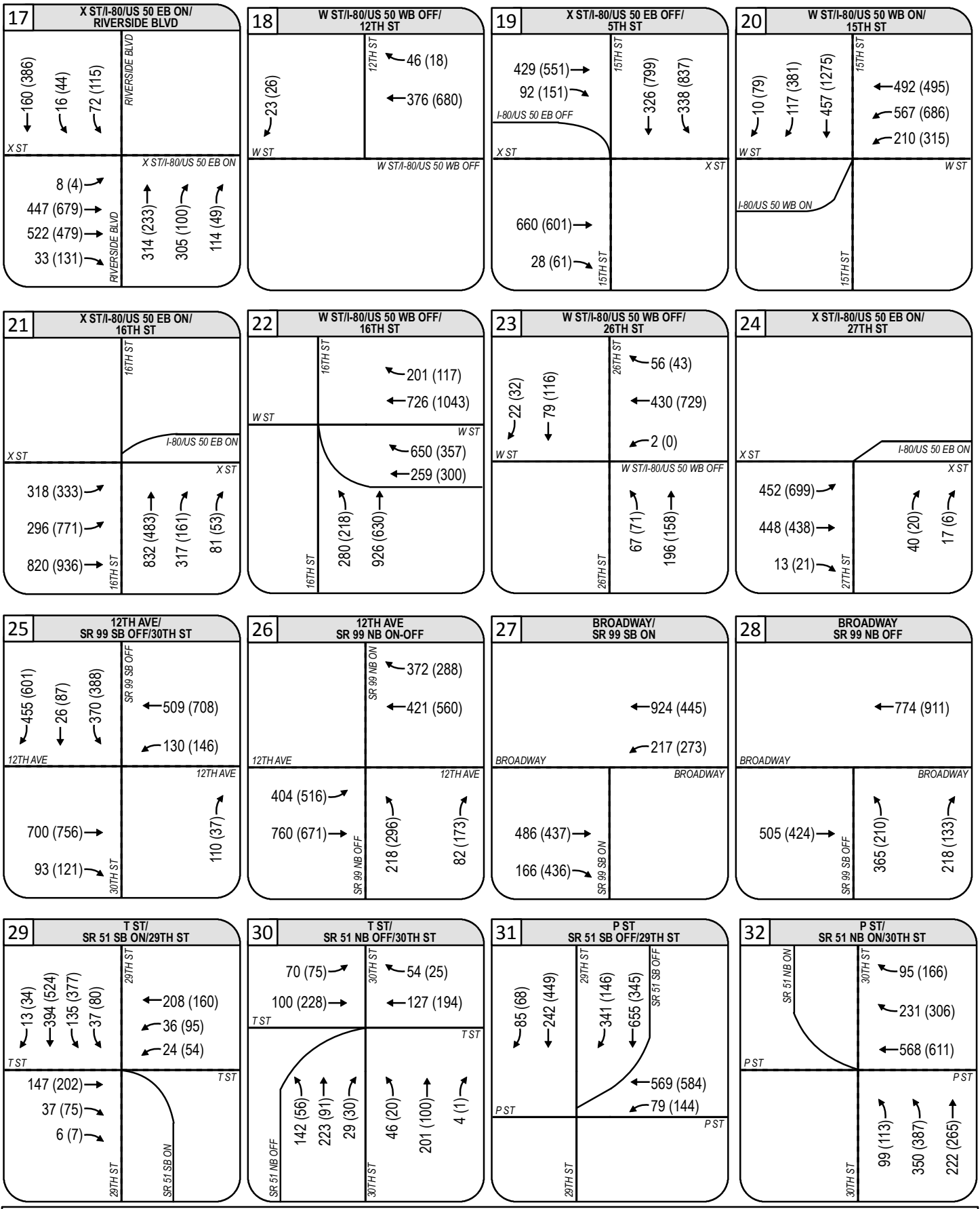


YEAR 2020 - NO PROJECT

FIGURE 1-A-1

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

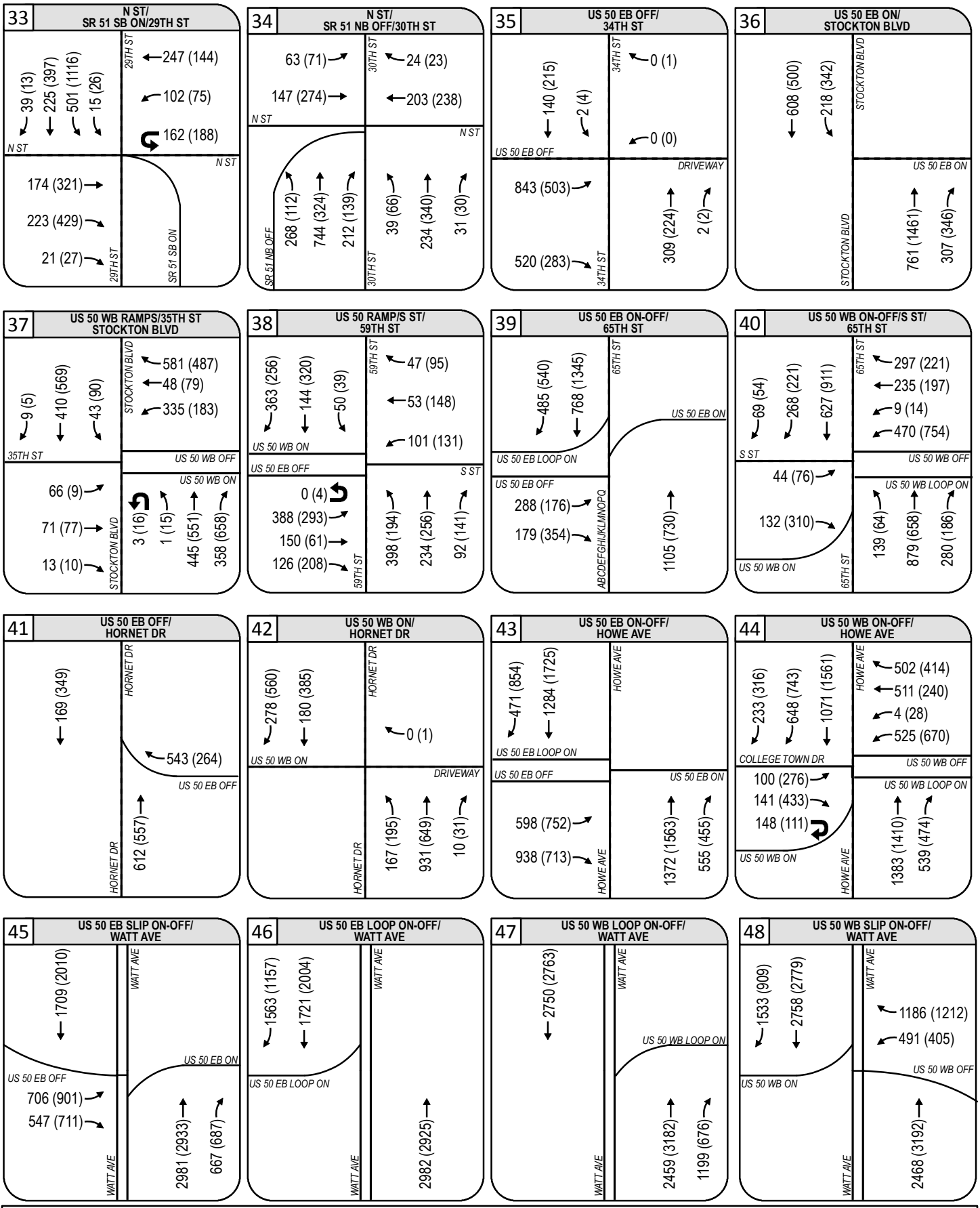


YEAR 2020 - NO PROJECT

FIGURE 1-A-2 (CONTINUED)

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

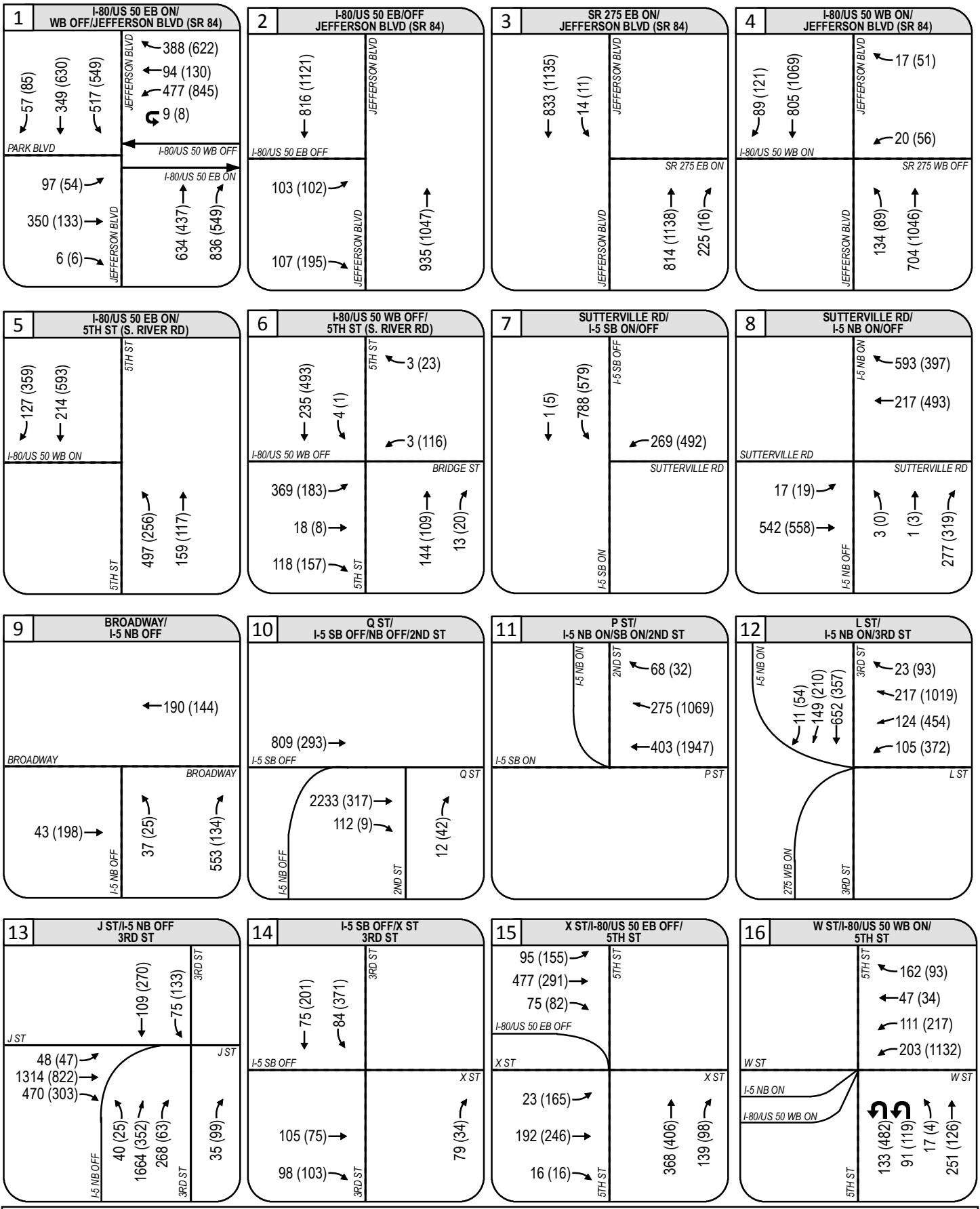


YEAR 2020 - NO PROJECT

FIGURE 1-A-3 (CONTINUED)

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT



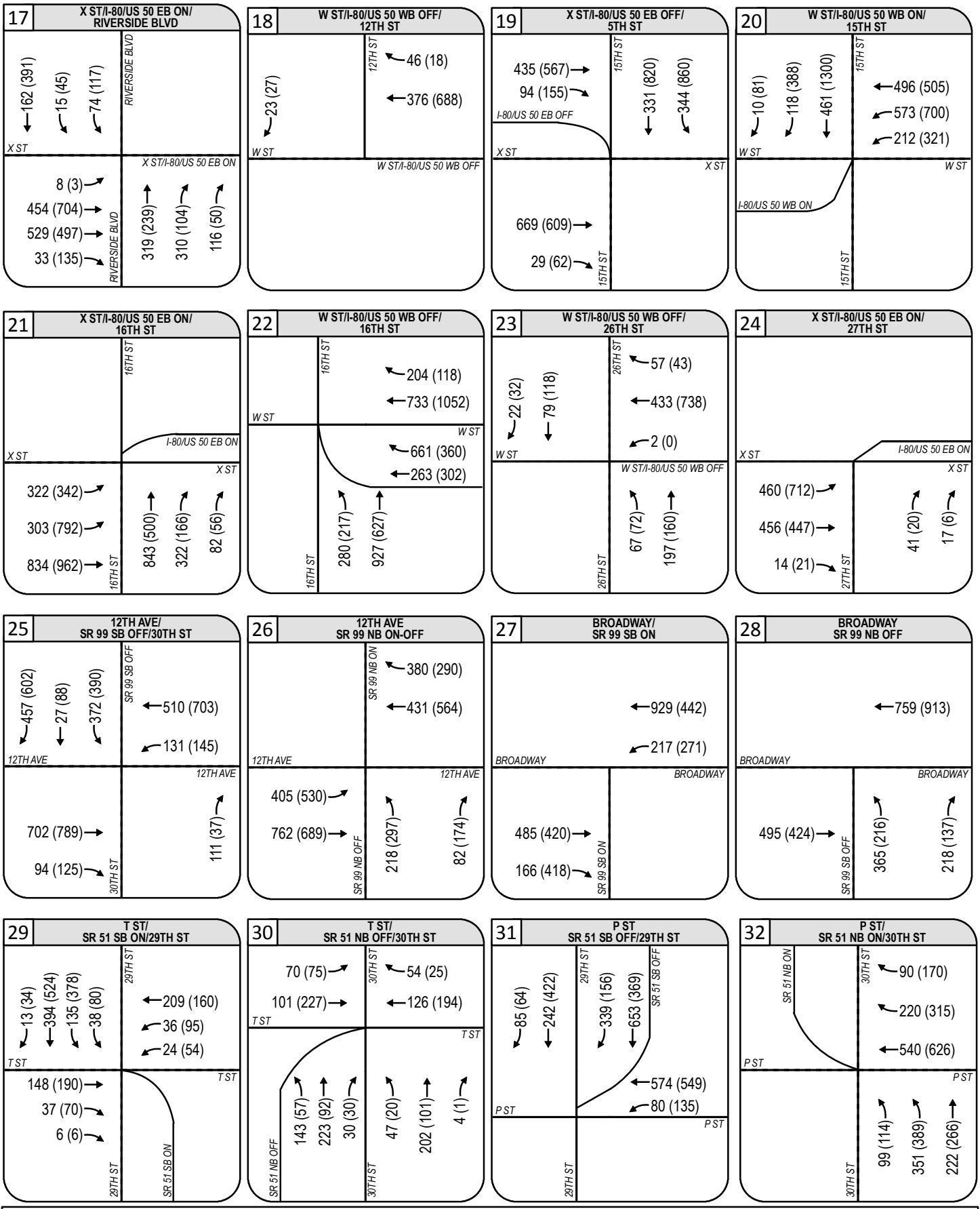
OPTION 1 - YEAR 2020 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-A-1

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

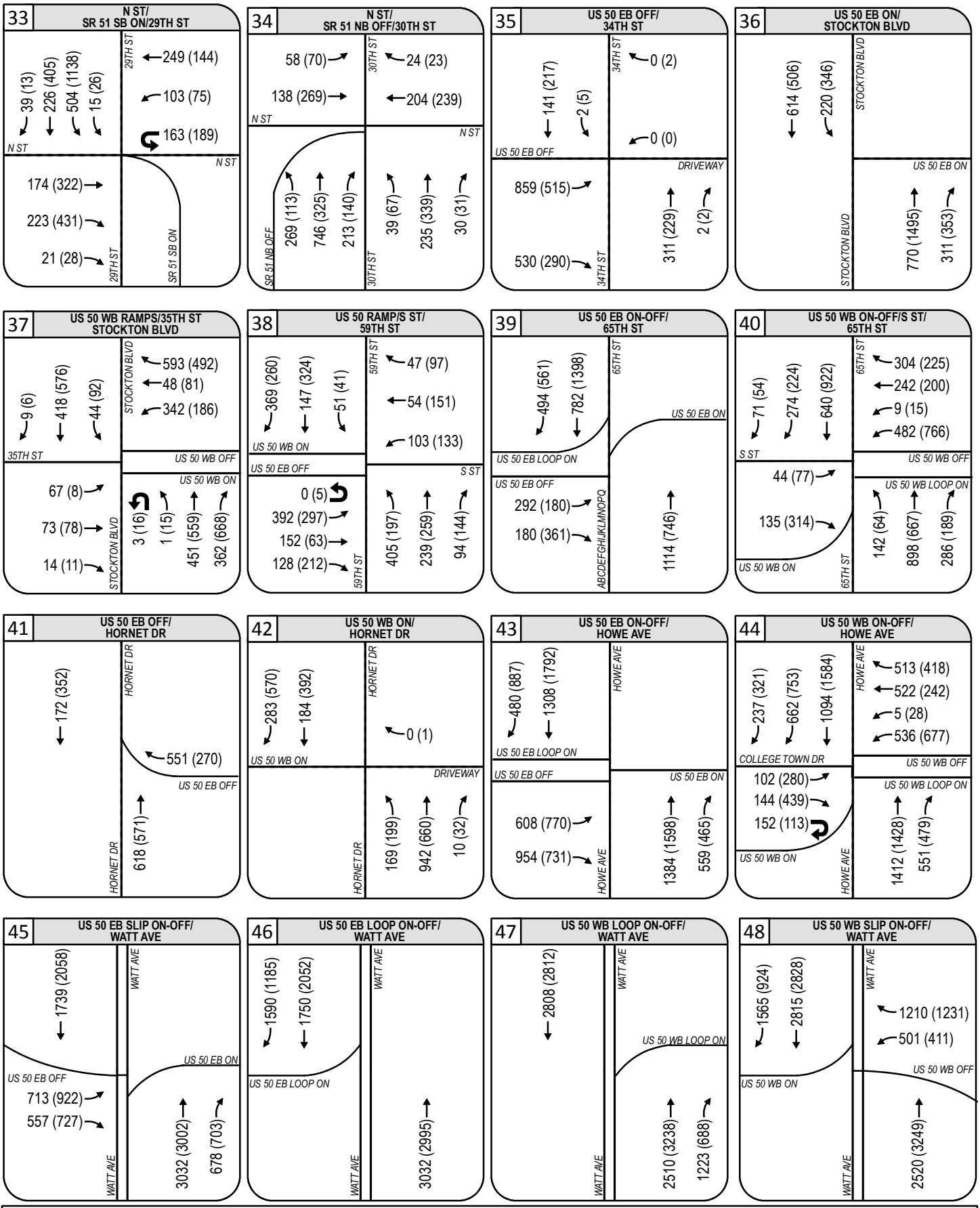


OPTION 1 - YEAR 2020 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-A-2 (CONTINUED)



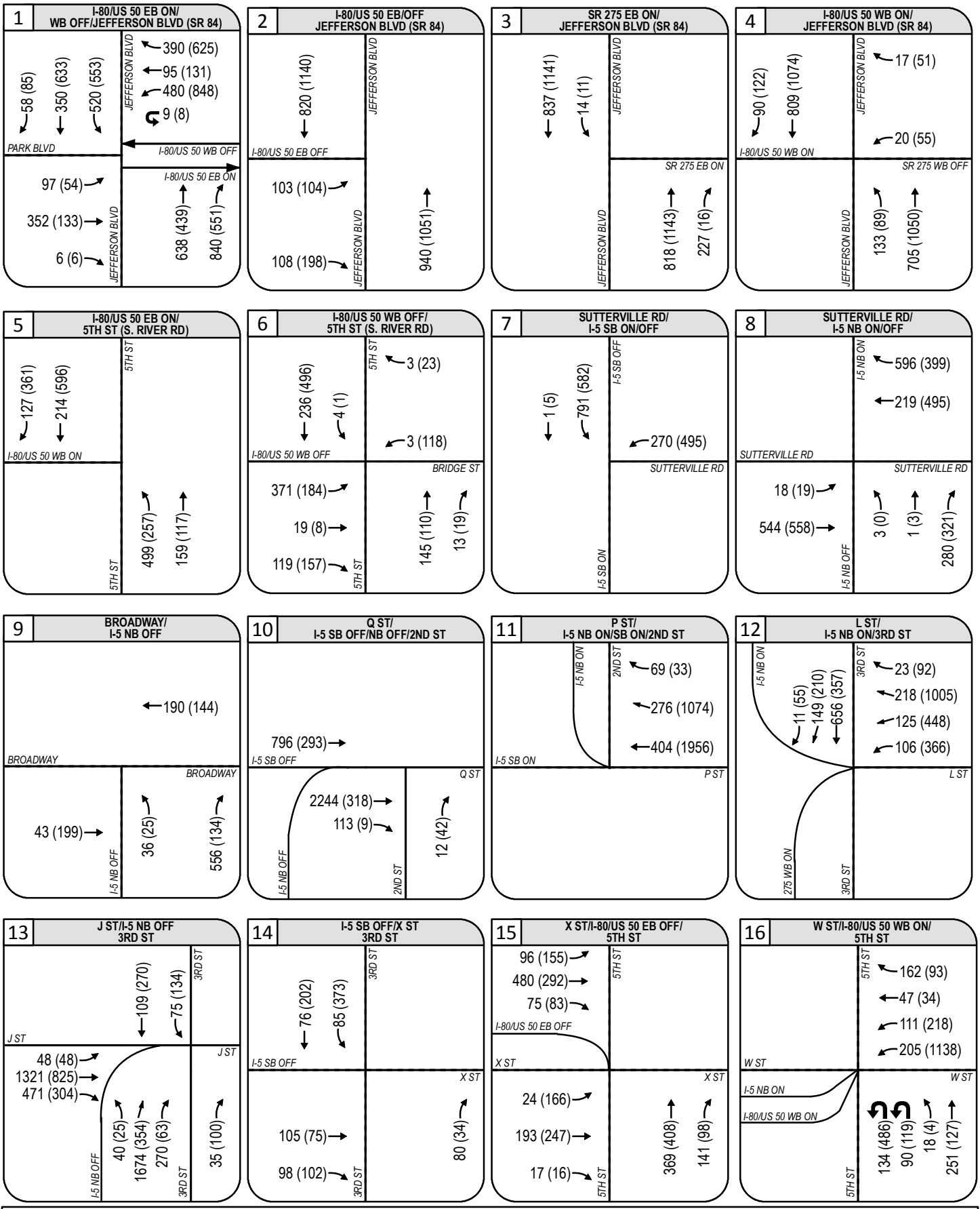
OPTION 1 - YEAR 2020 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-A-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

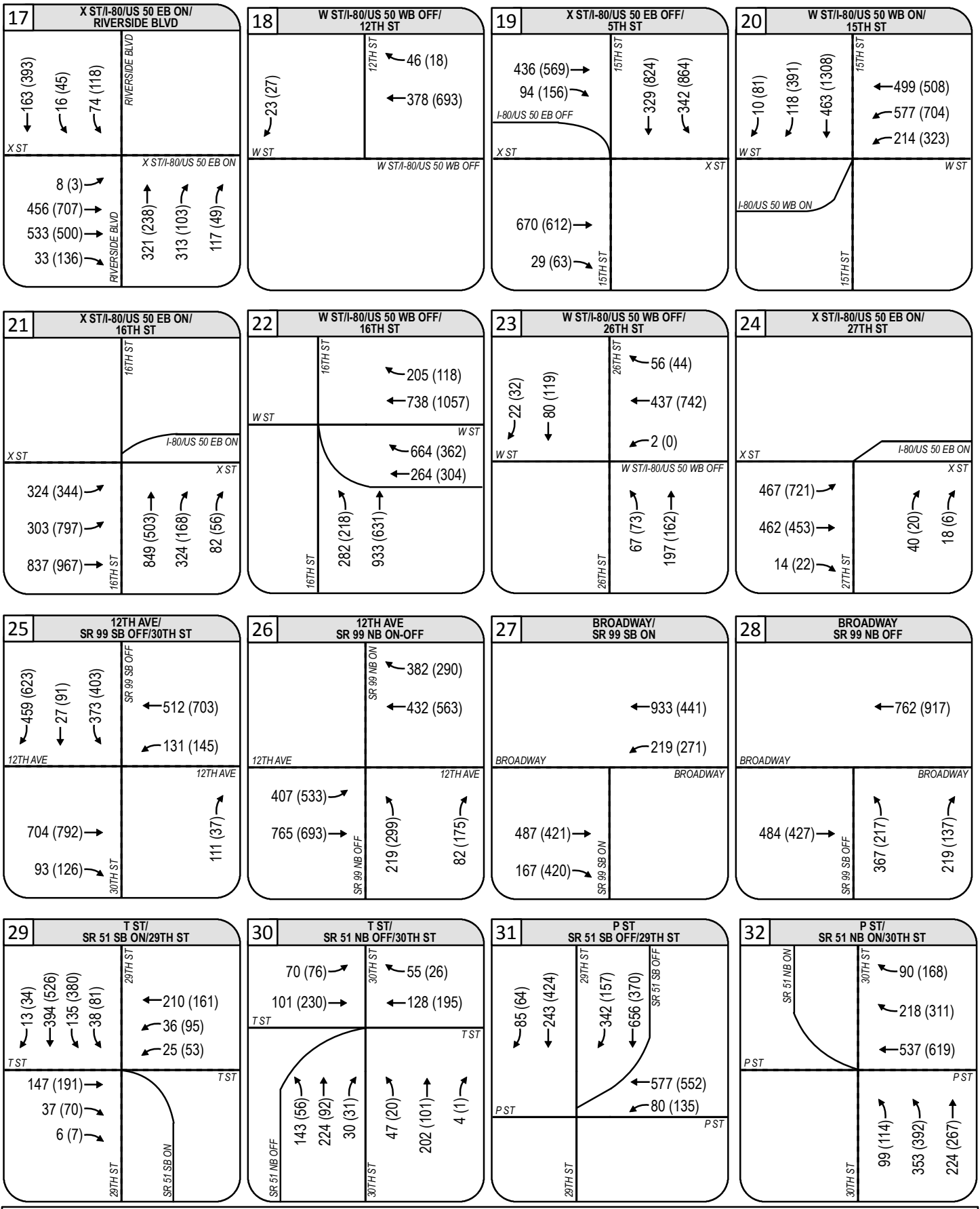


OPTION 1 - YEAR 2020 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-B-1



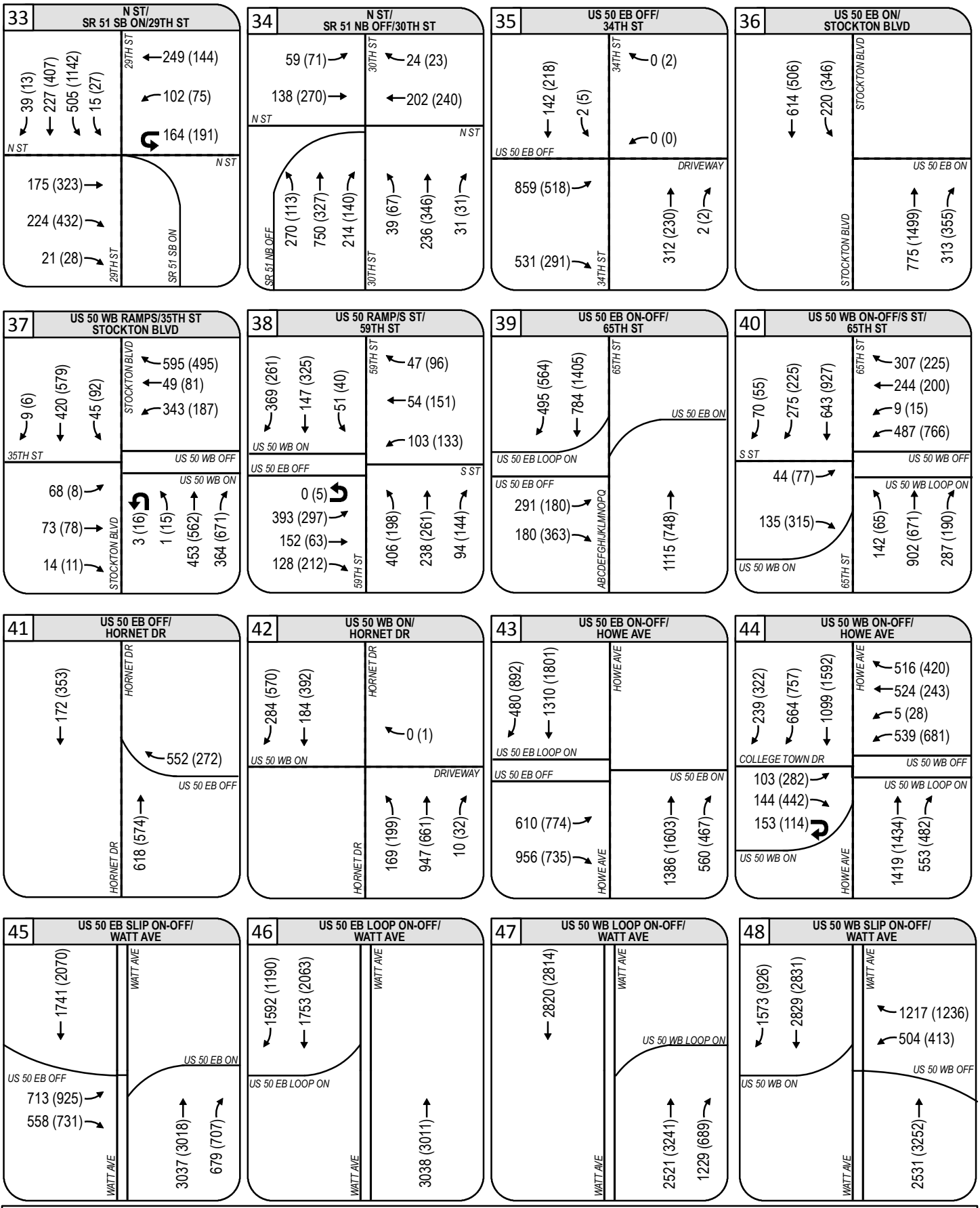
OPTION 1 - YEAR 2020 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-B-2 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



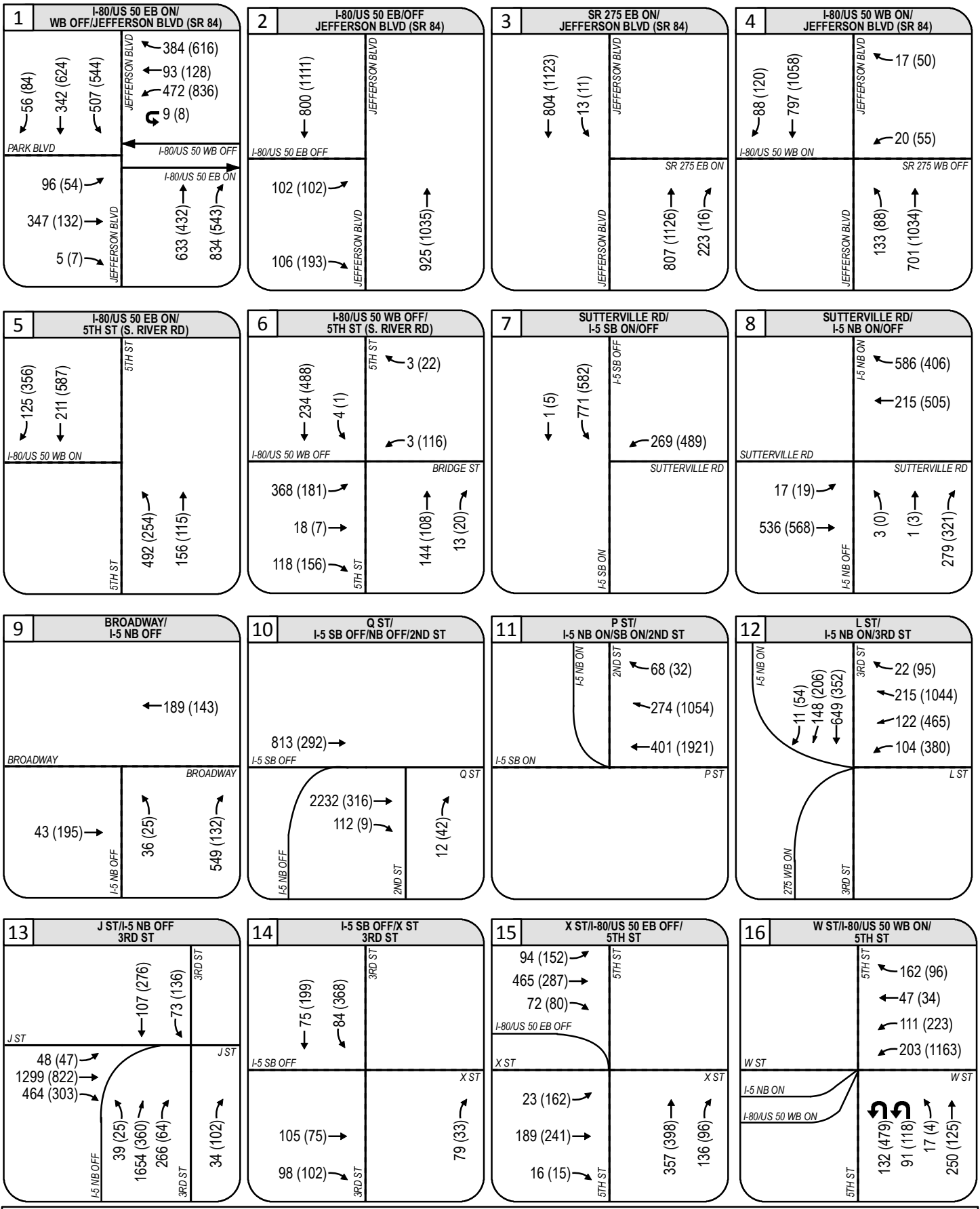
OPTION 1 - YEAR 2020 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-B-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



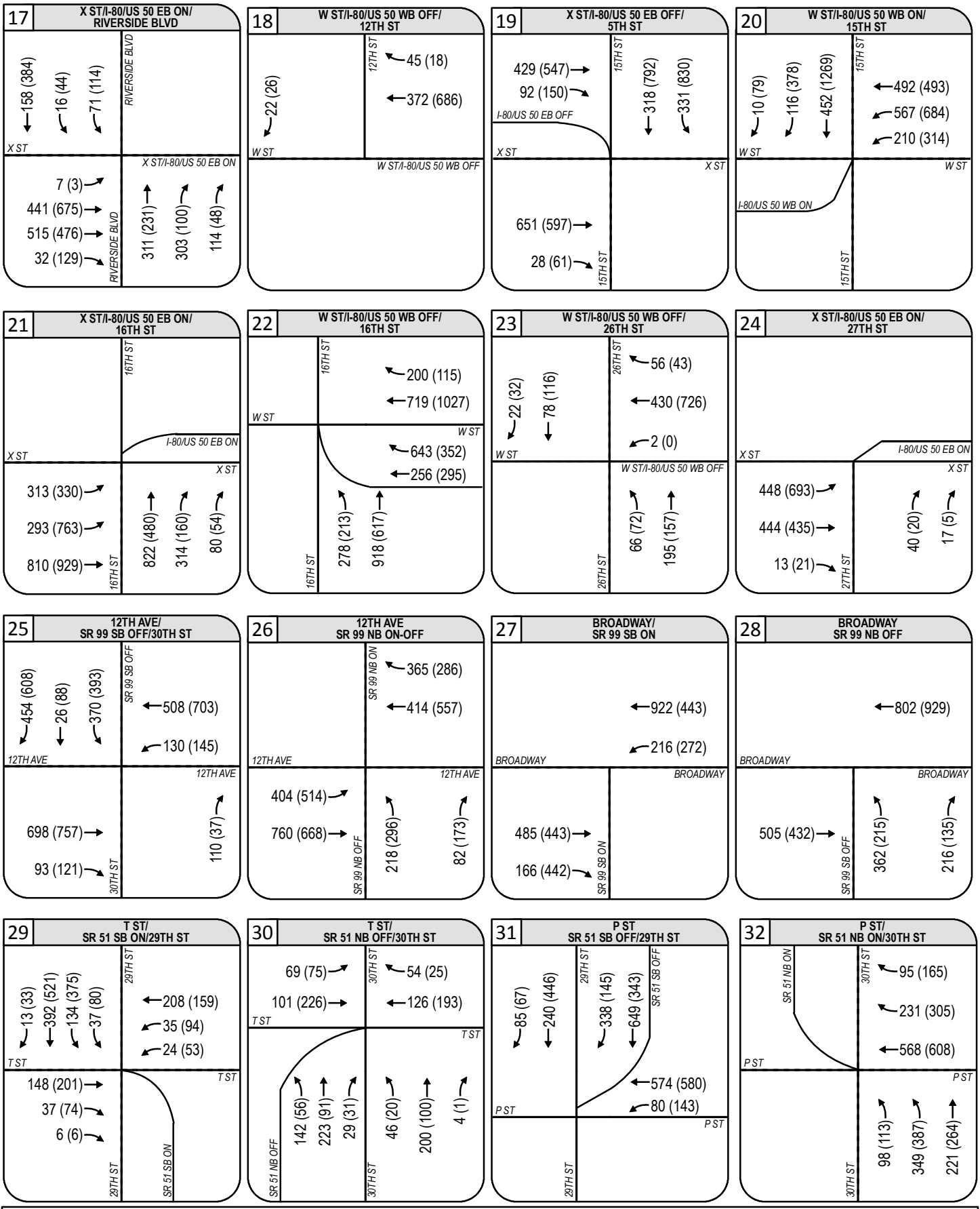
OPTION 1 - YEAR 2020 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-C-1

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



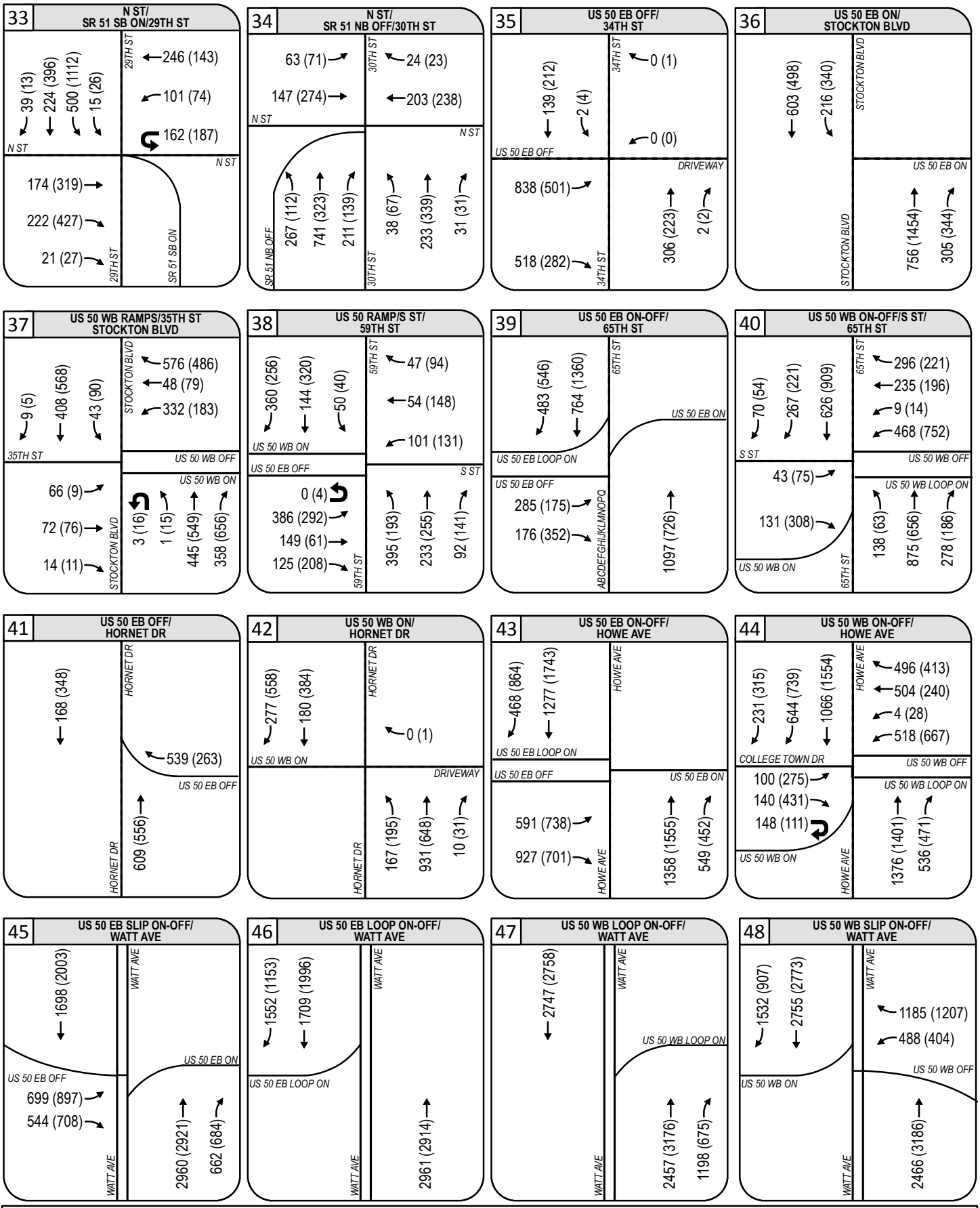
OPTION 1 - YEAR 2020 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-C-2 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



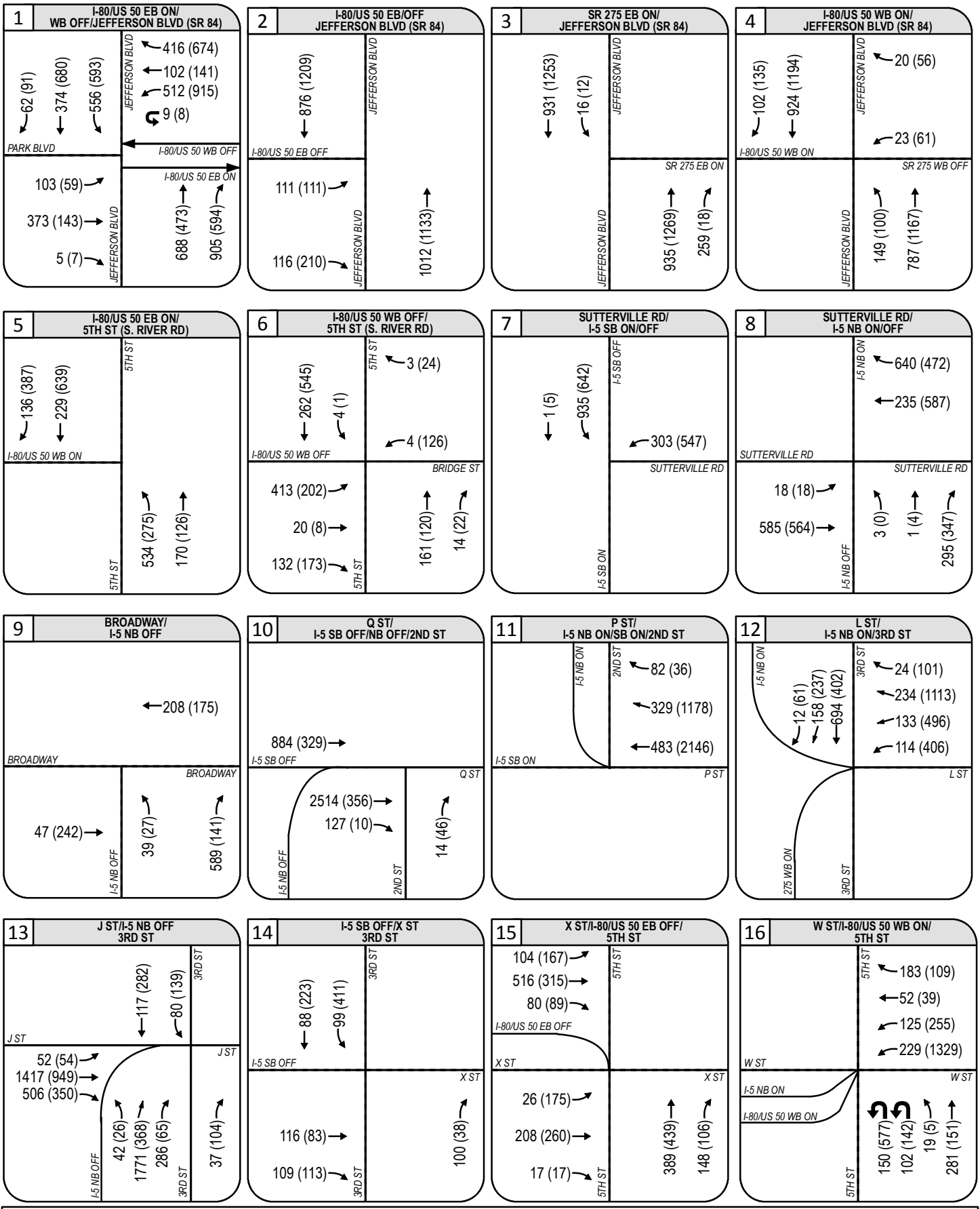
OPTION 1 - YEAR 2020 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 5-C-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

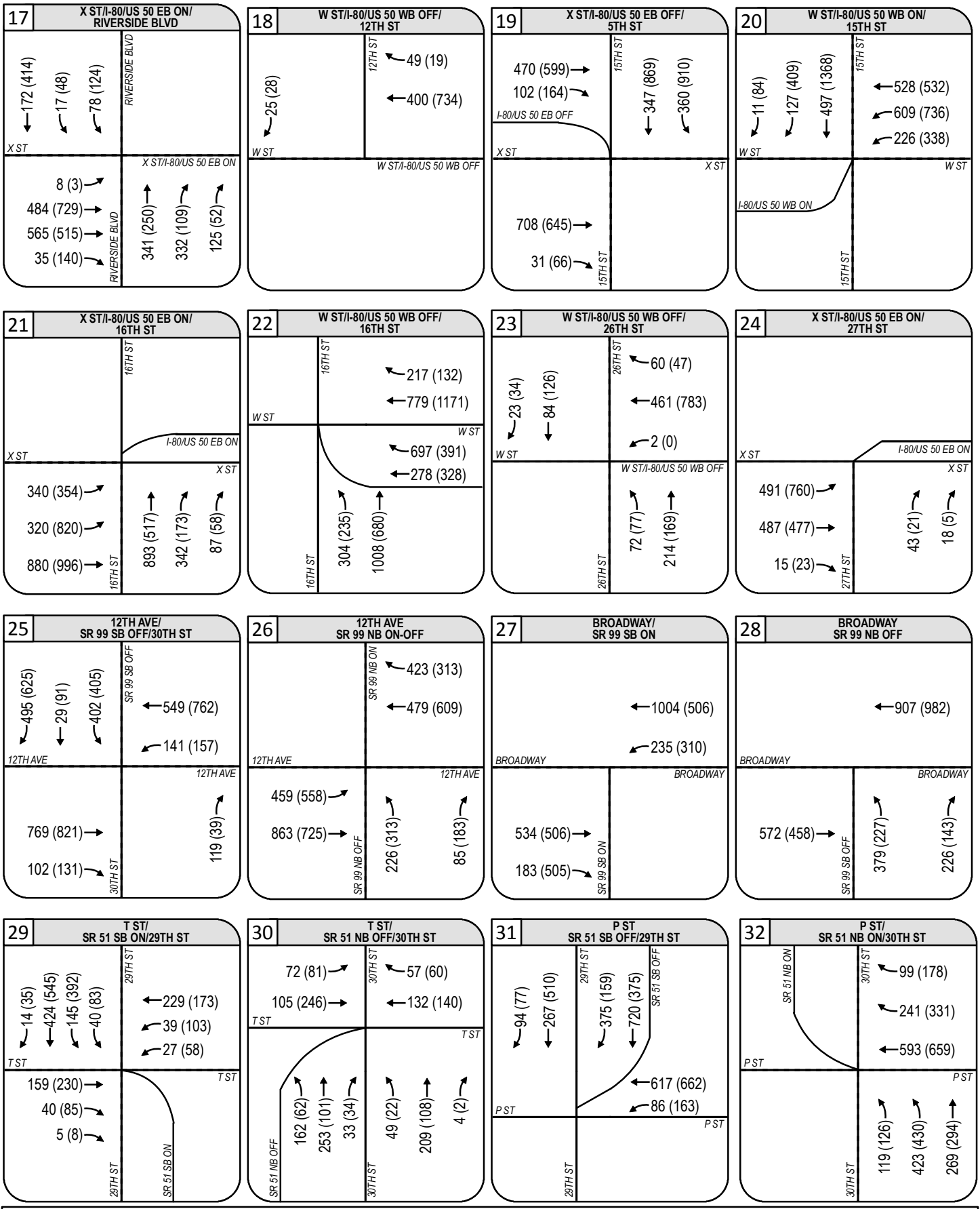


YEAR 2030 - NO PROJECT

FIGURE 1-B-1

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

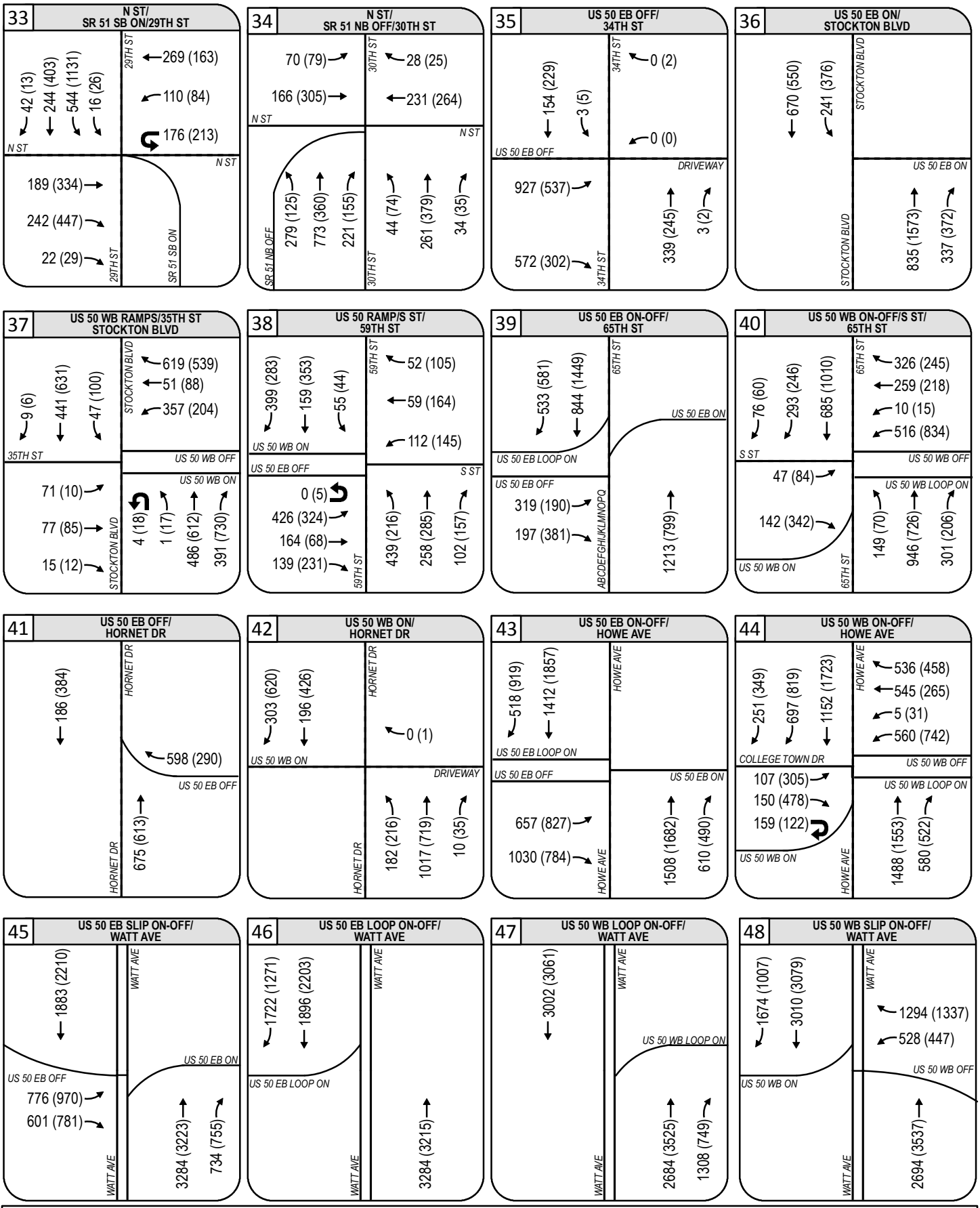


YEAR 2030 - NO PROJECT

FIGURE 1-B-2 (CONTINUED)

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

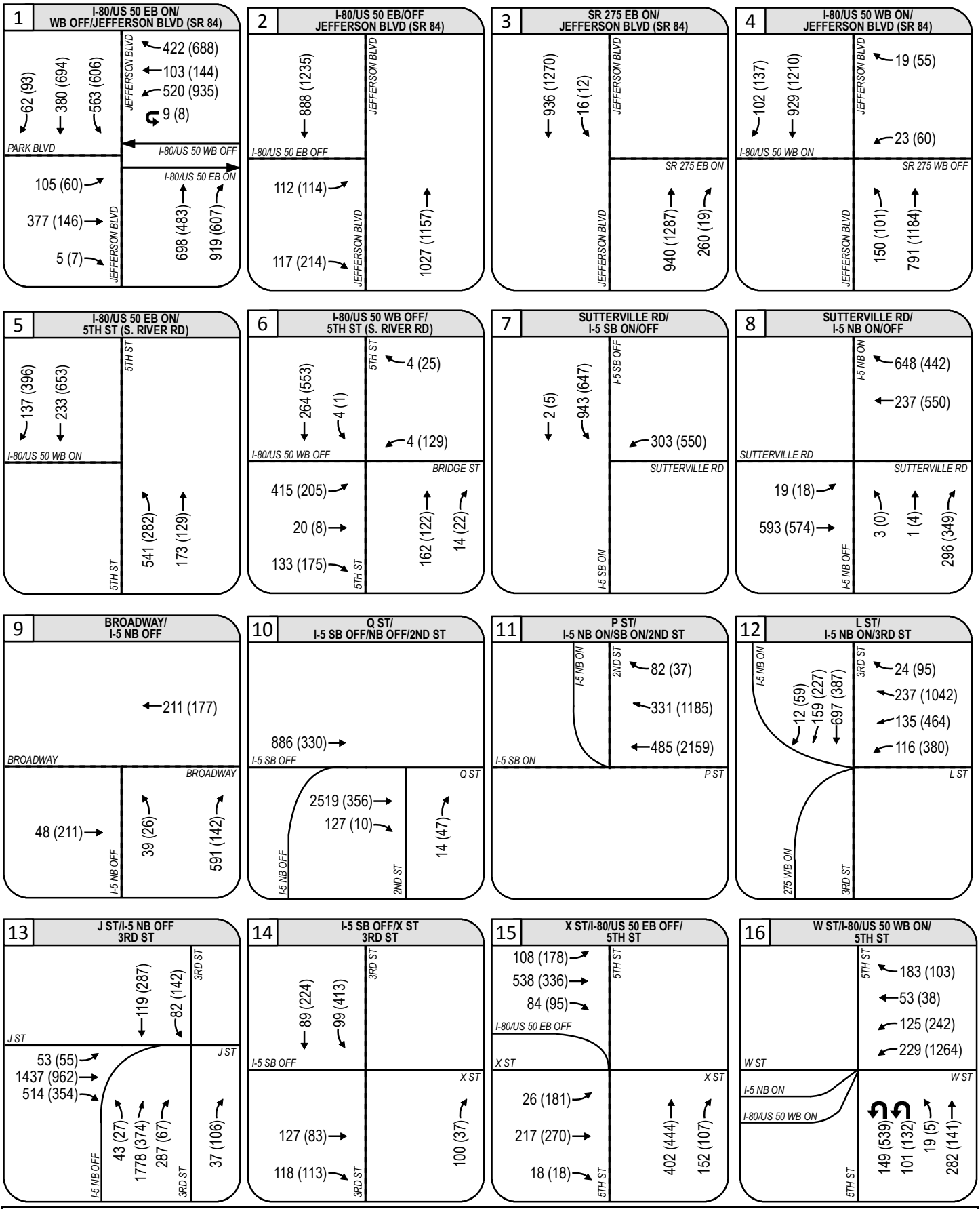


YEAR 2030 - NO PROJECT

FIGURE 1-B-3 (CONTINUED)

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

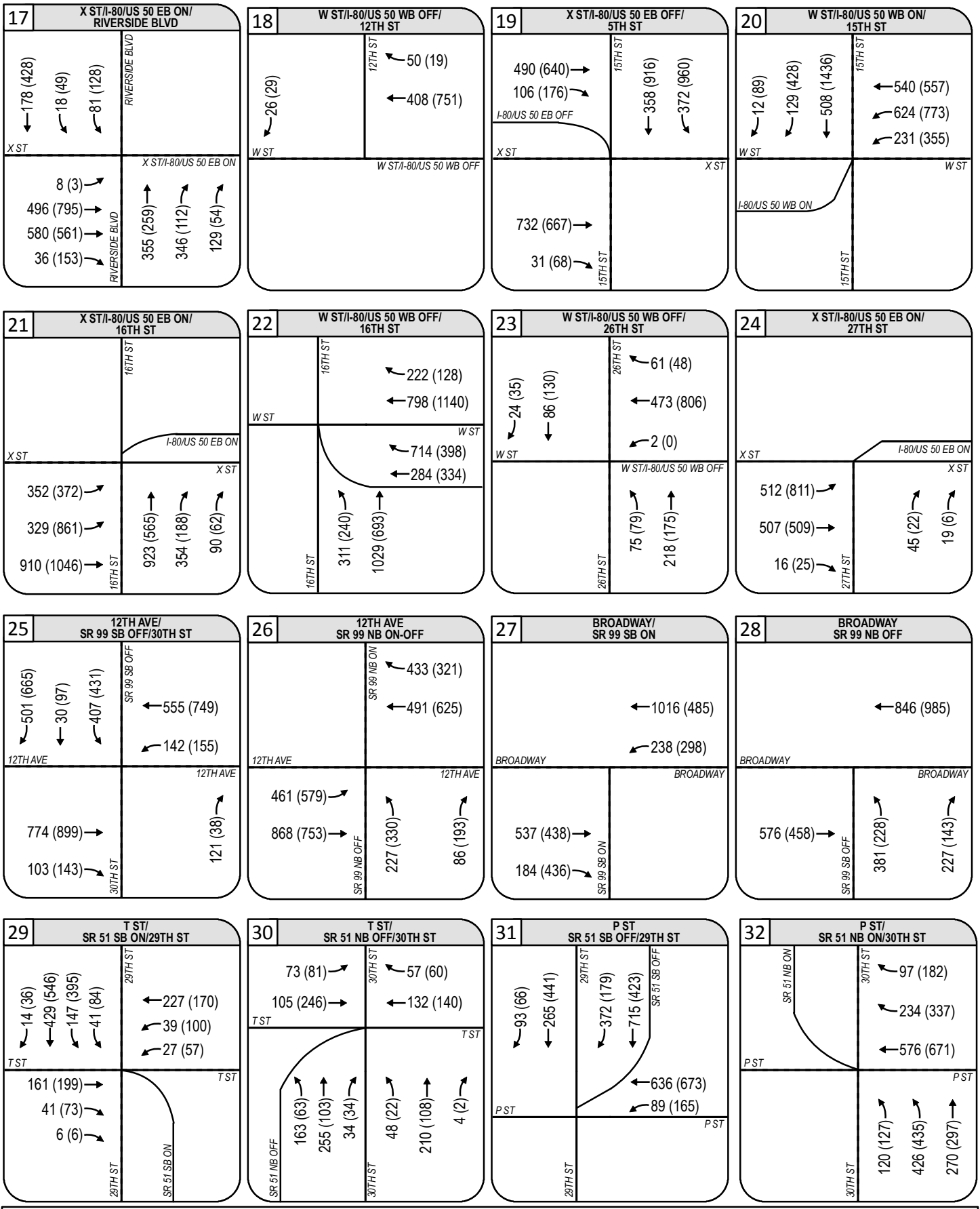


OPTION 1 - YEAR 2030 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-A-1

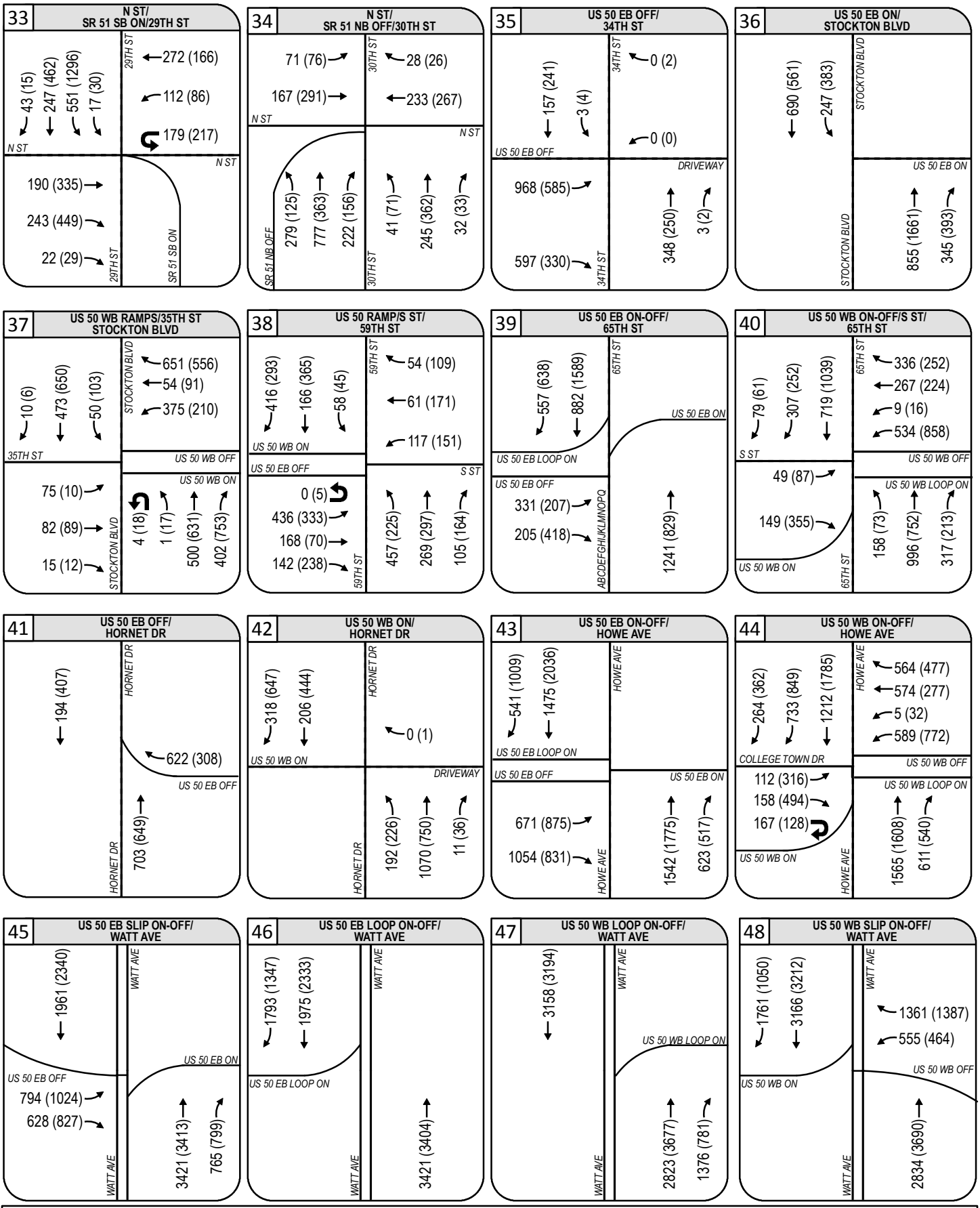


OPTION 1 - YEAR 2030 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-A-2 (CONTINUED)



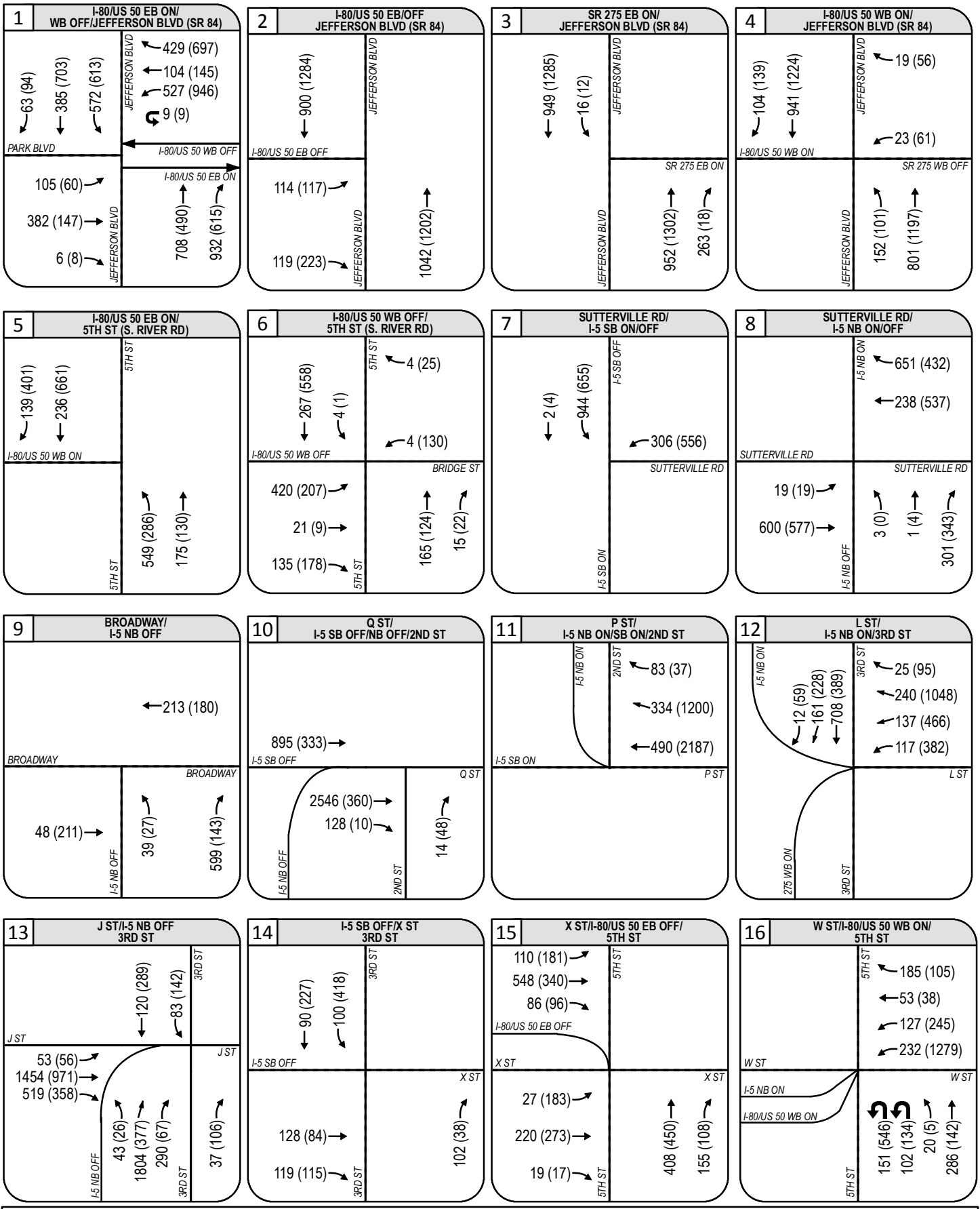
OPTION 1 - YEAR 2030 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-A-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



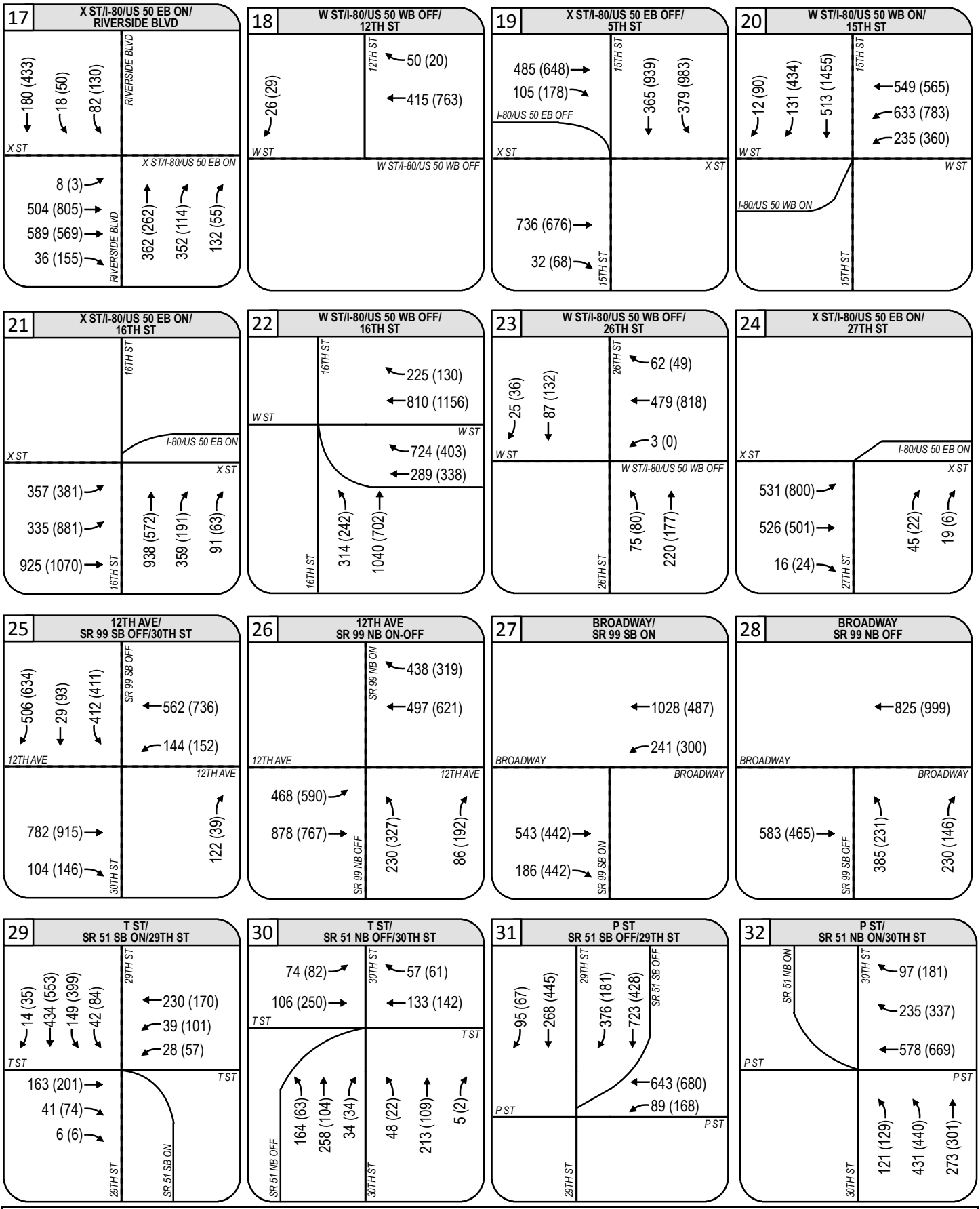
OPTION 1 - YEAR 2030 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-B-1

DEVELOPING INNOVATIVE DESIGN SOLUTIONS



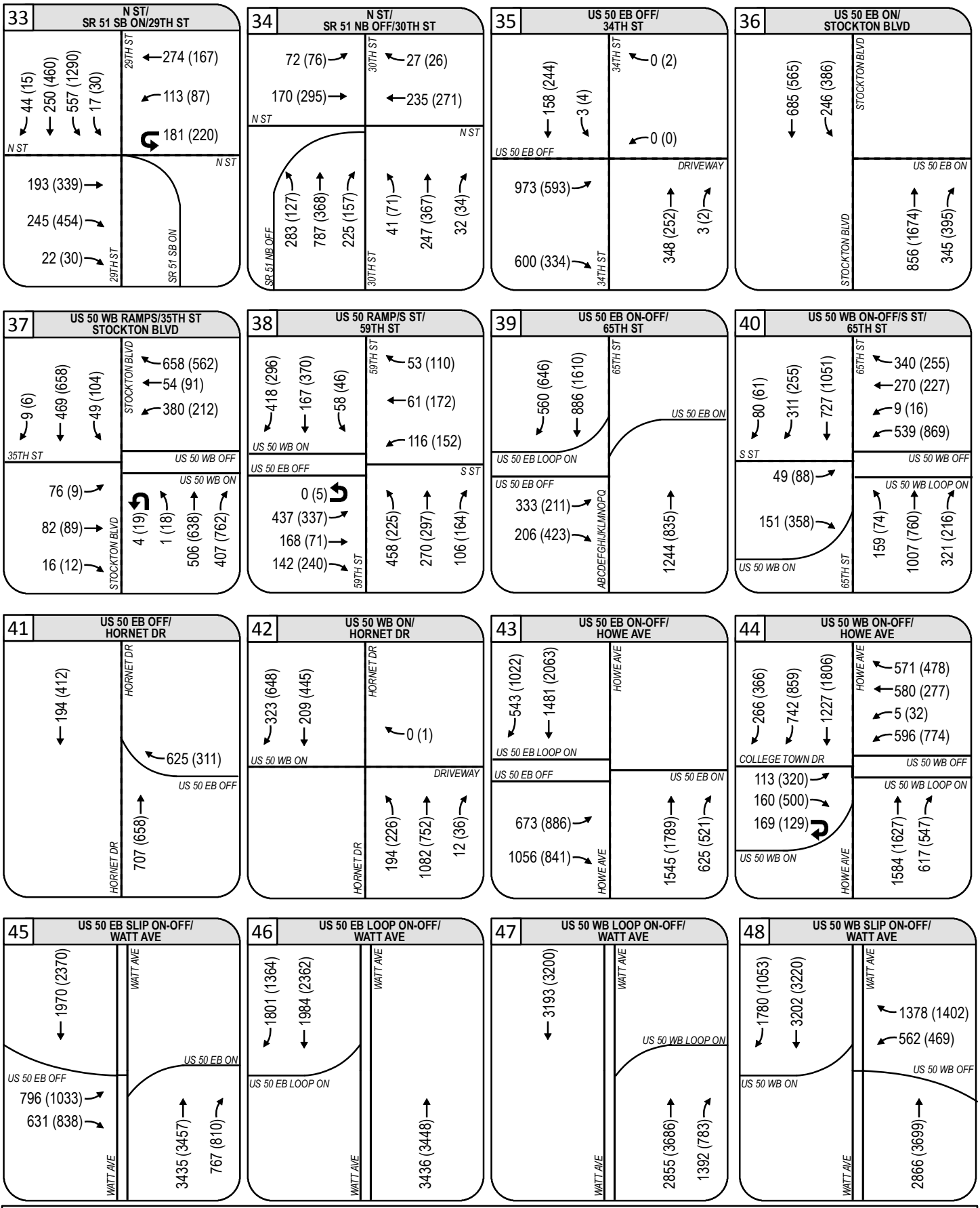
OPTION 1 - YEAR 2030 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-B-2 (CONTINUED)

DEVELOPING INNOVATIVE DESIGN SOLUTIONS



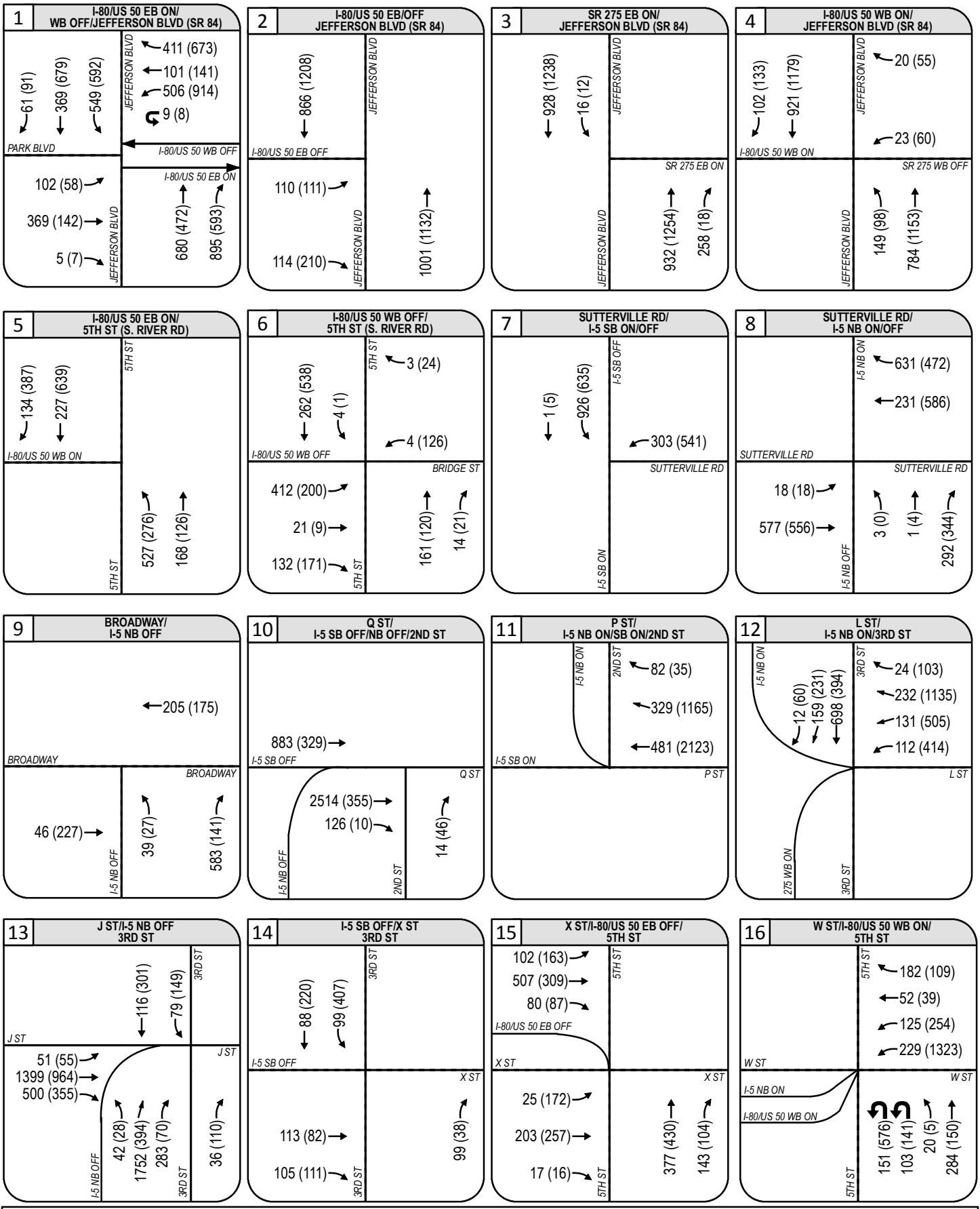
OPTION 1 - YEAR 2030 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-B-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



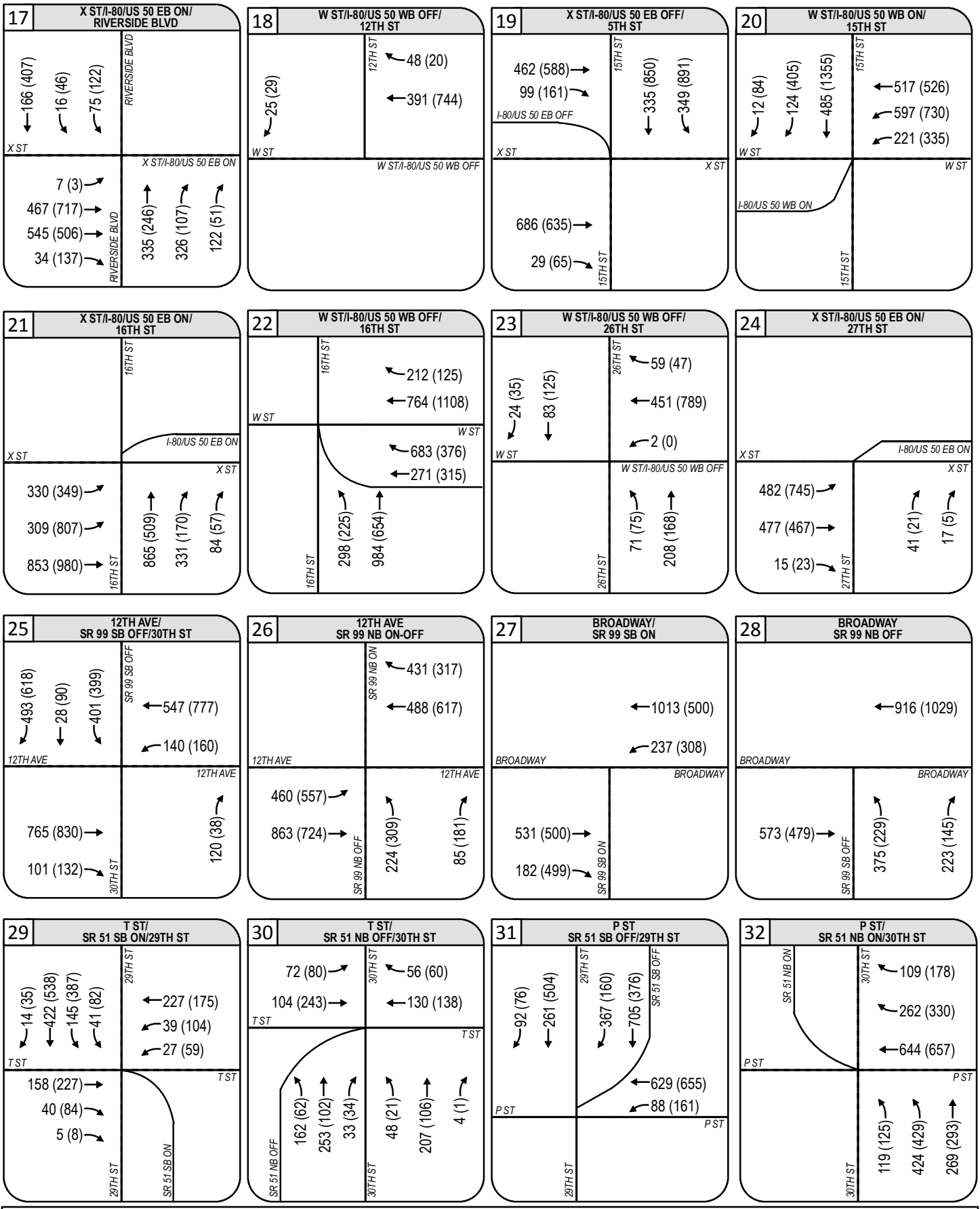
OPTION 1 - YEAR 2030 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-C-1

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

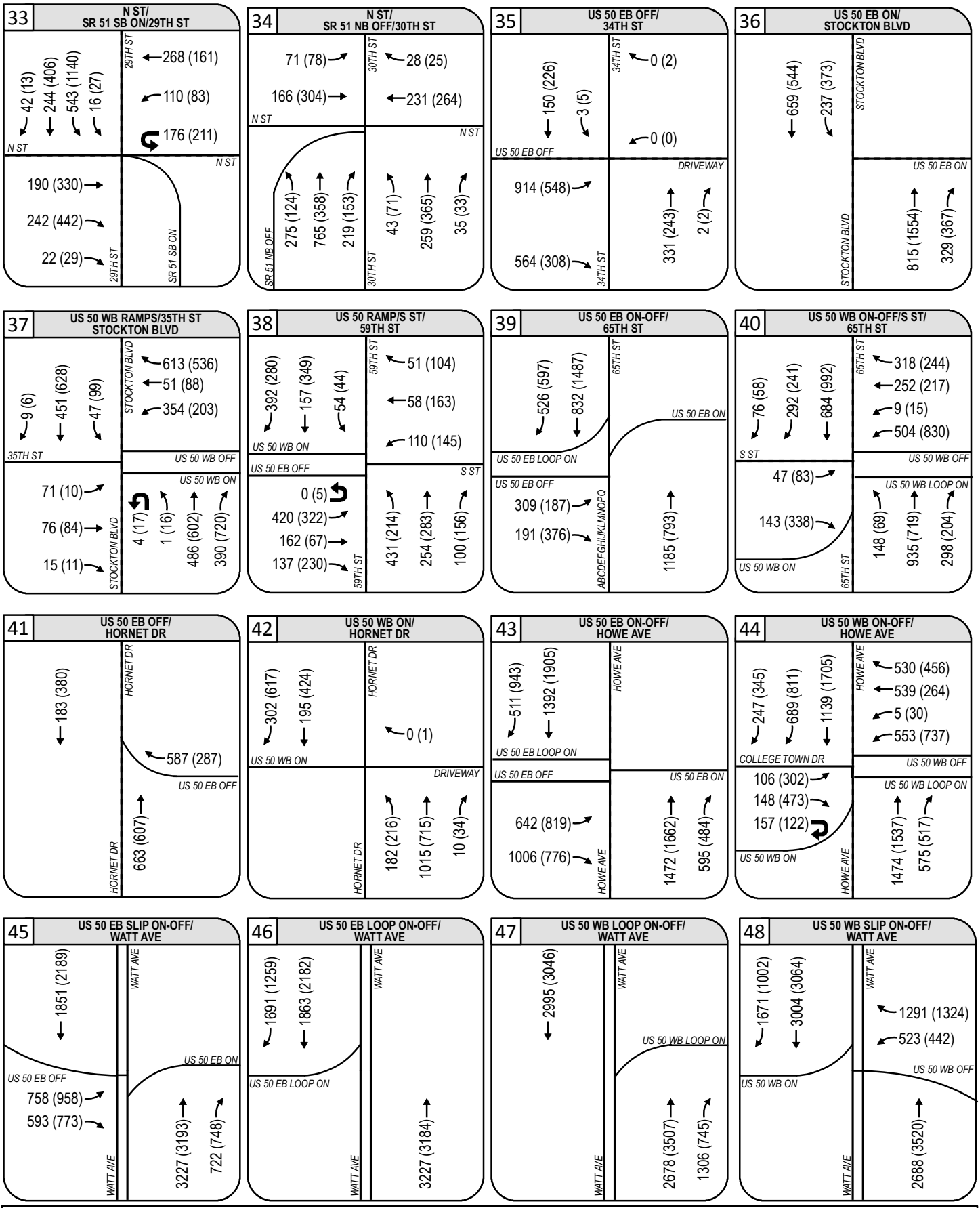


OPTION 1 - YEAR 2030 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-C-2 (CONTINUED)

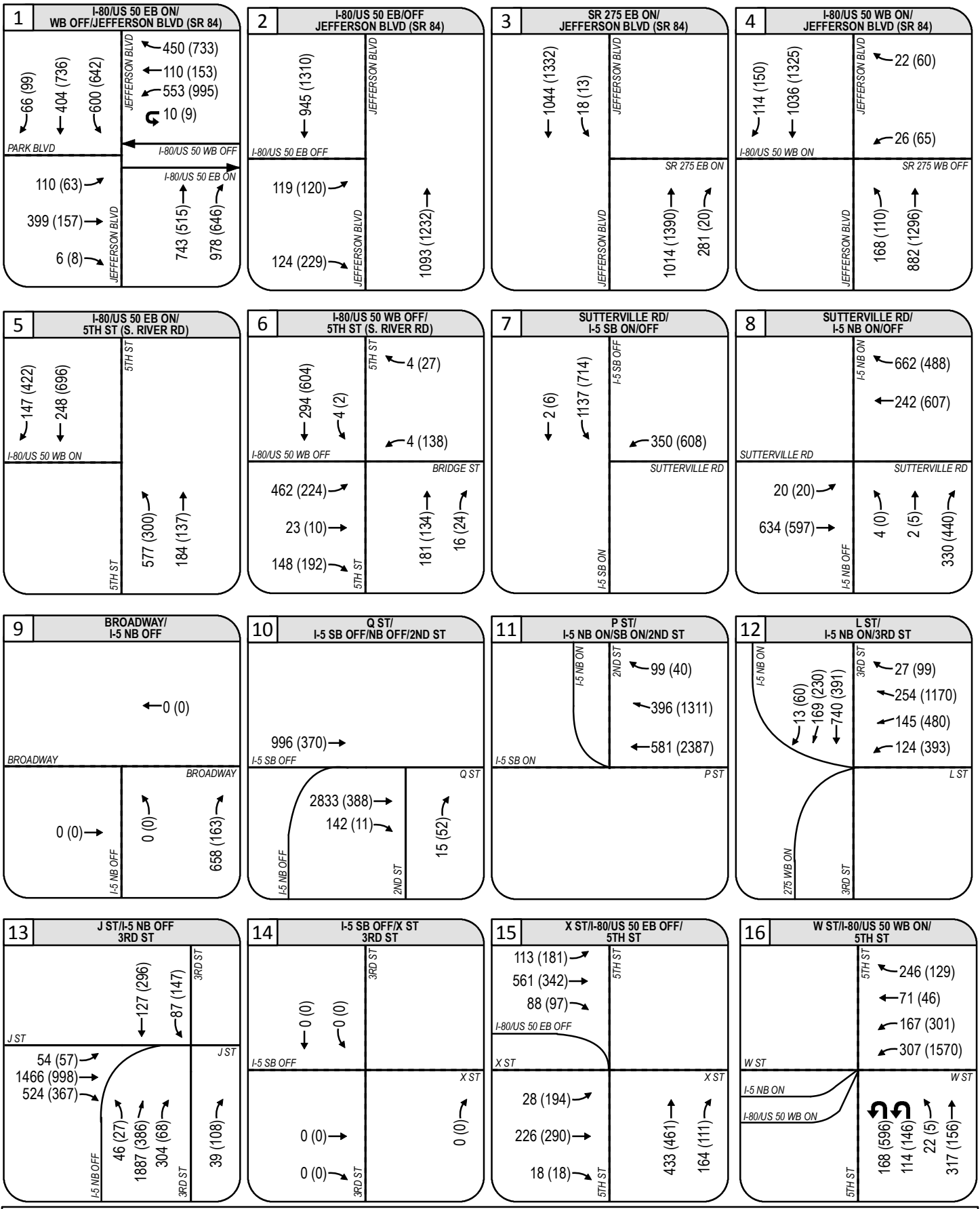


OPTION 1 - YEAR 2030 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 6-C-3 (CONTINUED)

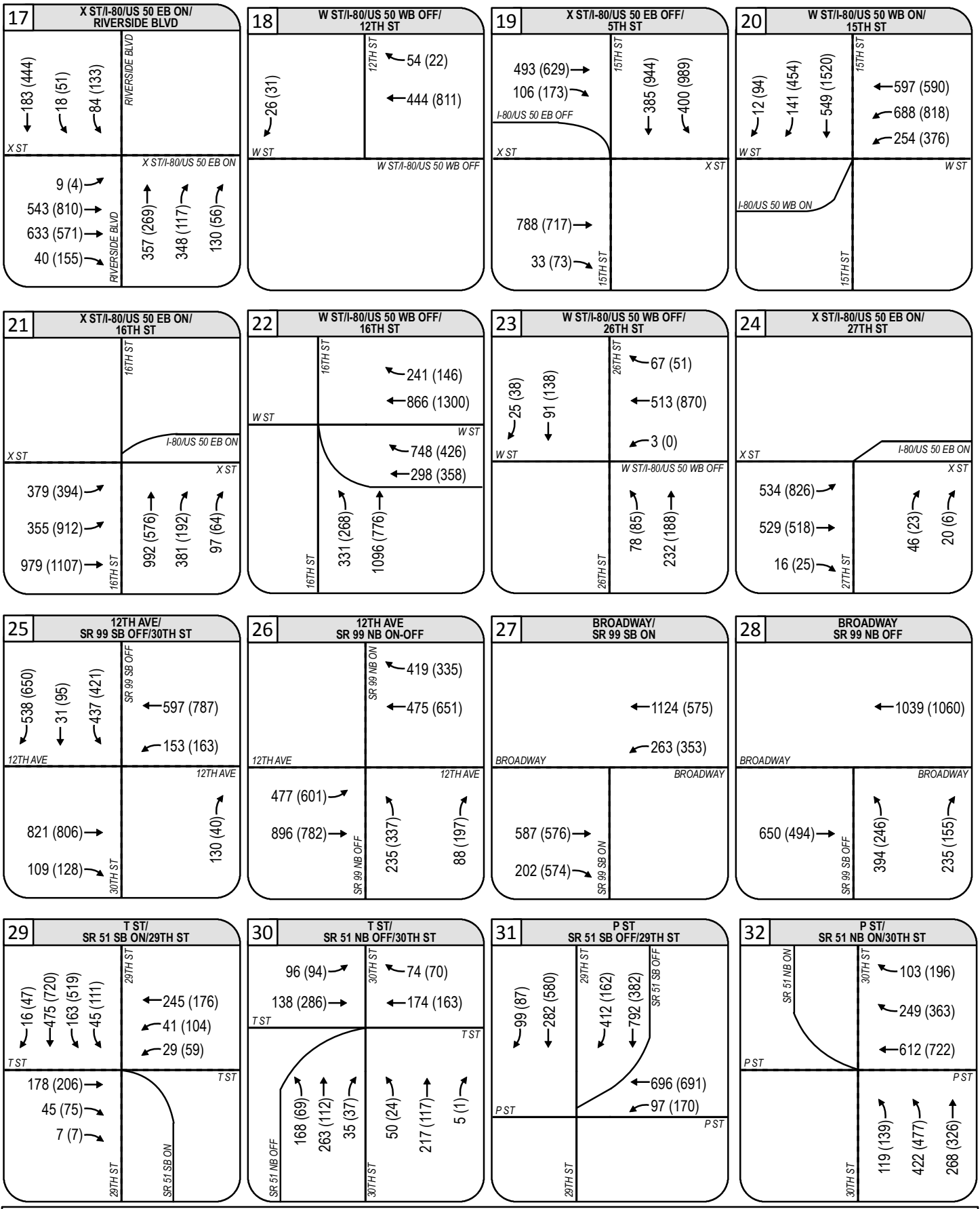


YEAR 2040 - NO PROJECT

FIGURE 1-C-1

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

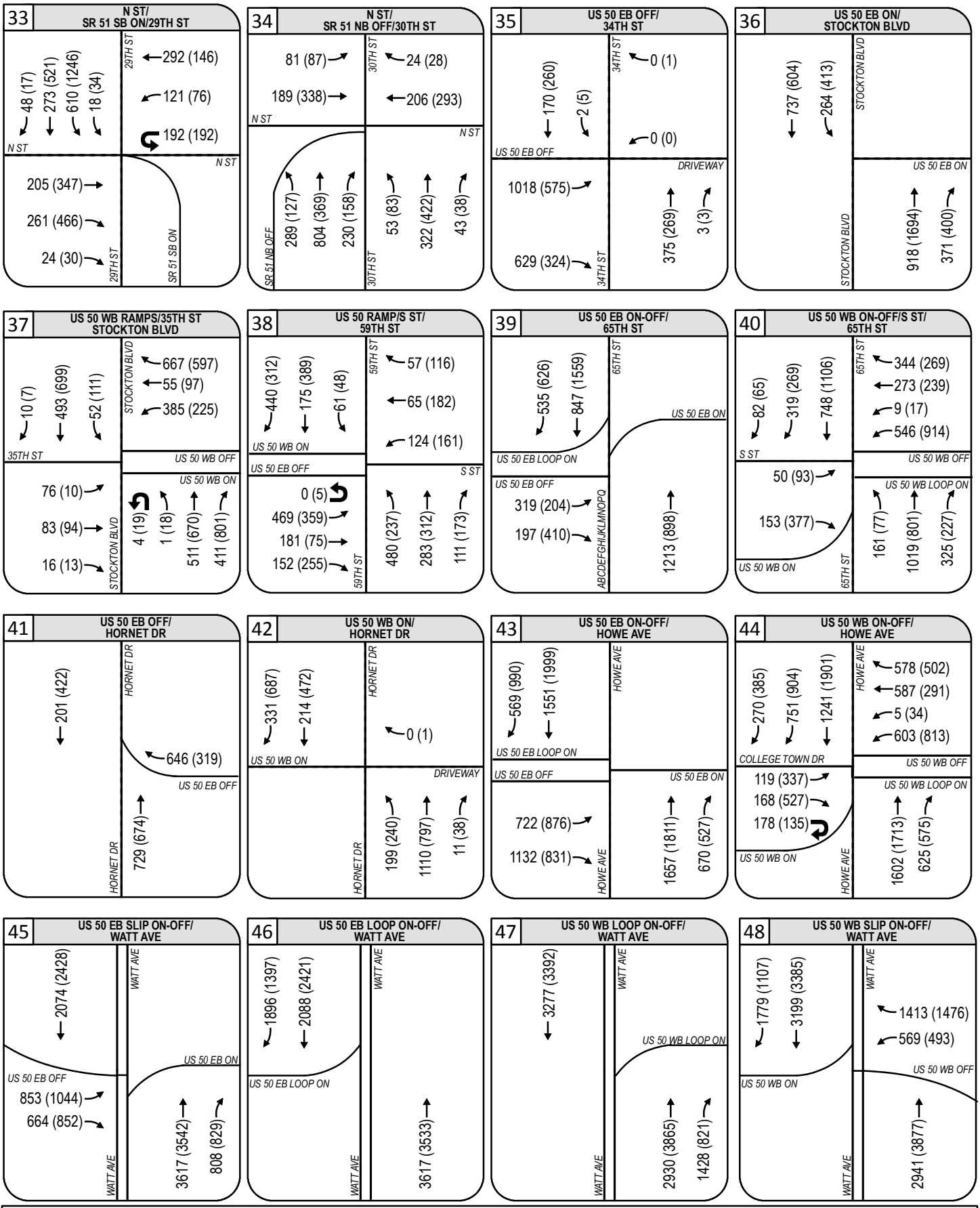


YEAR 2040 - NO PROJECT

FIGURE 1-C-2 (CONTINUED)

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

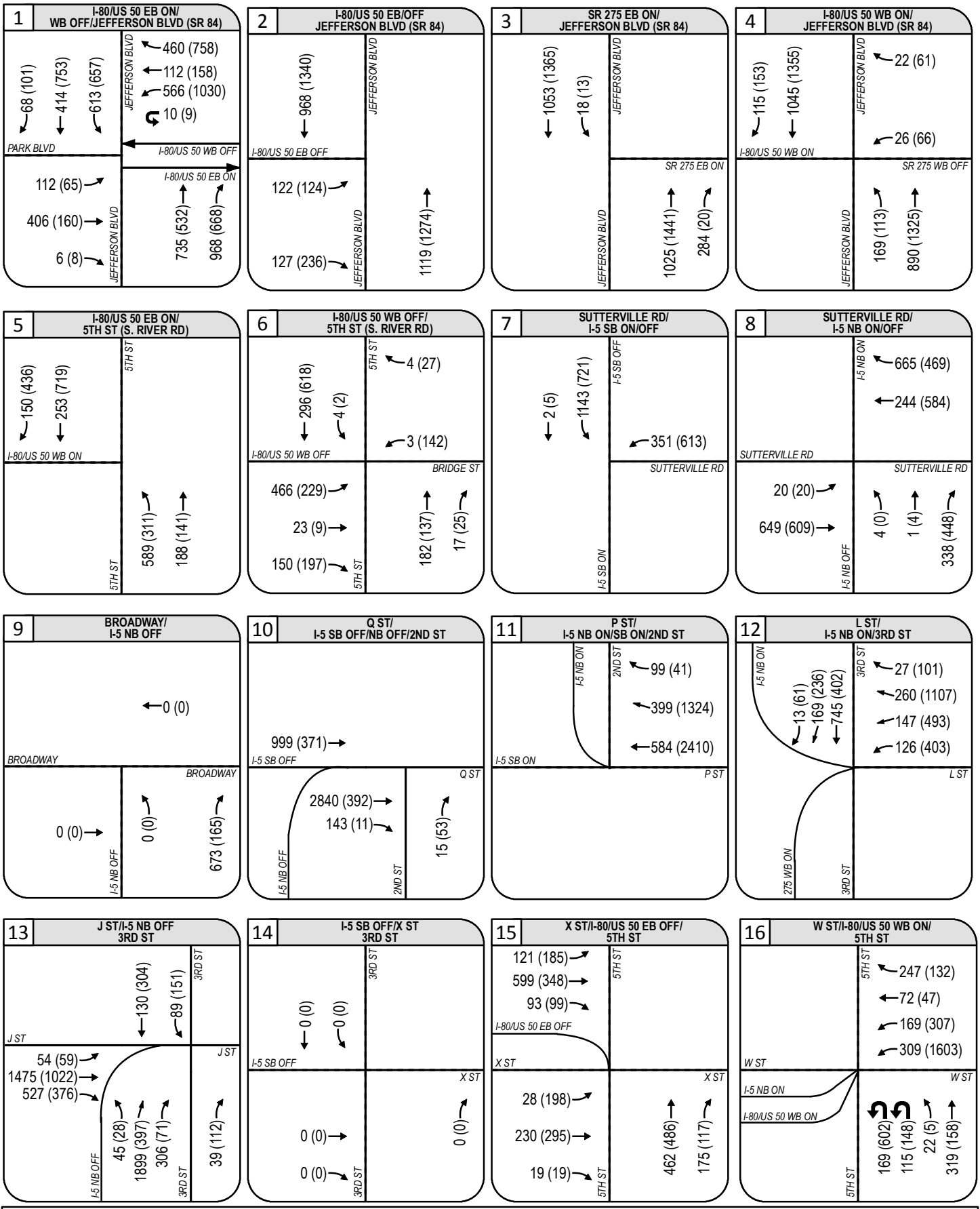


YEAR 2040 - NO PROJECT

FIGURE 1-C-3 (CONTINUED)

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT



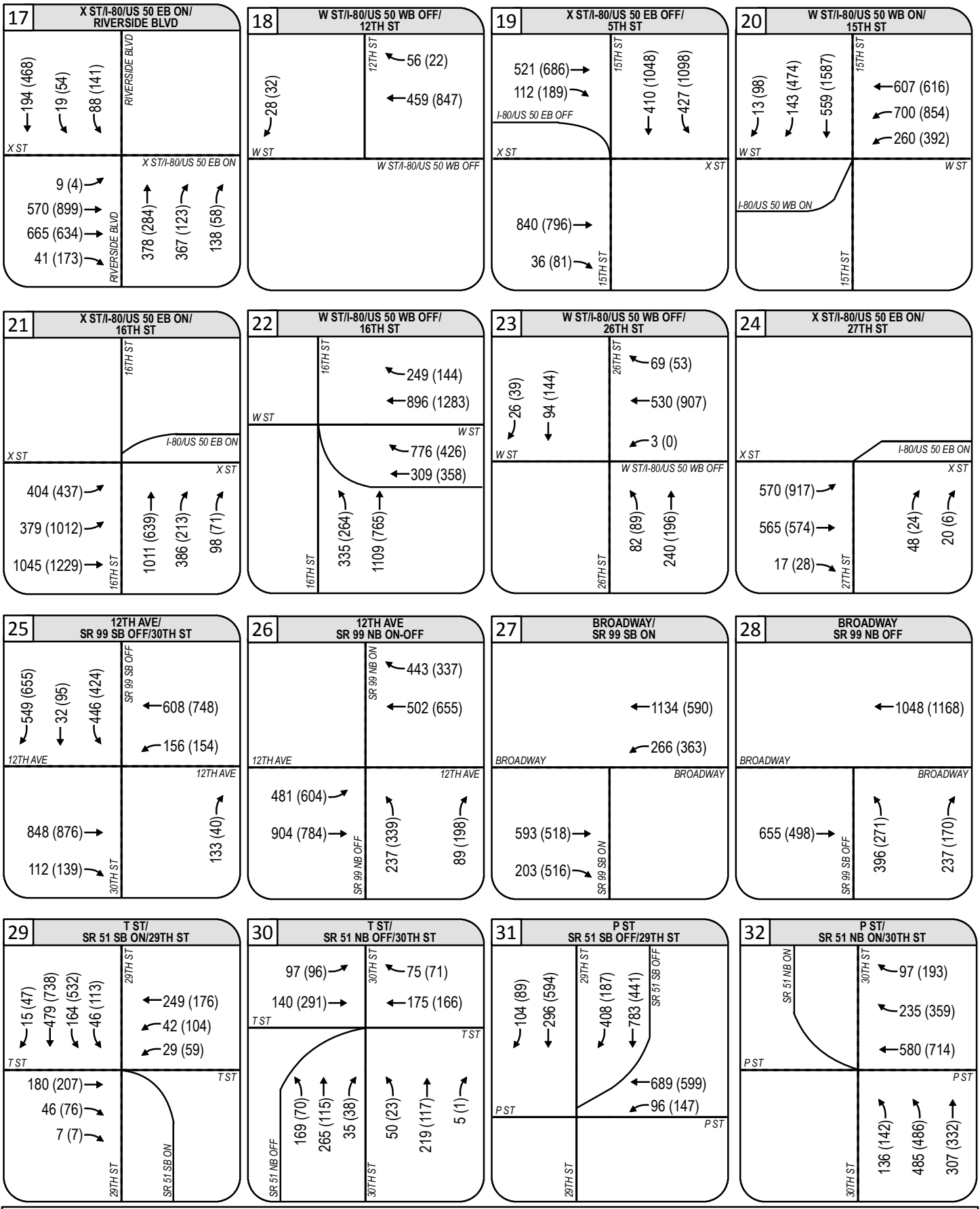
OPTION 1 - YEAR 2040 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-A-1

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

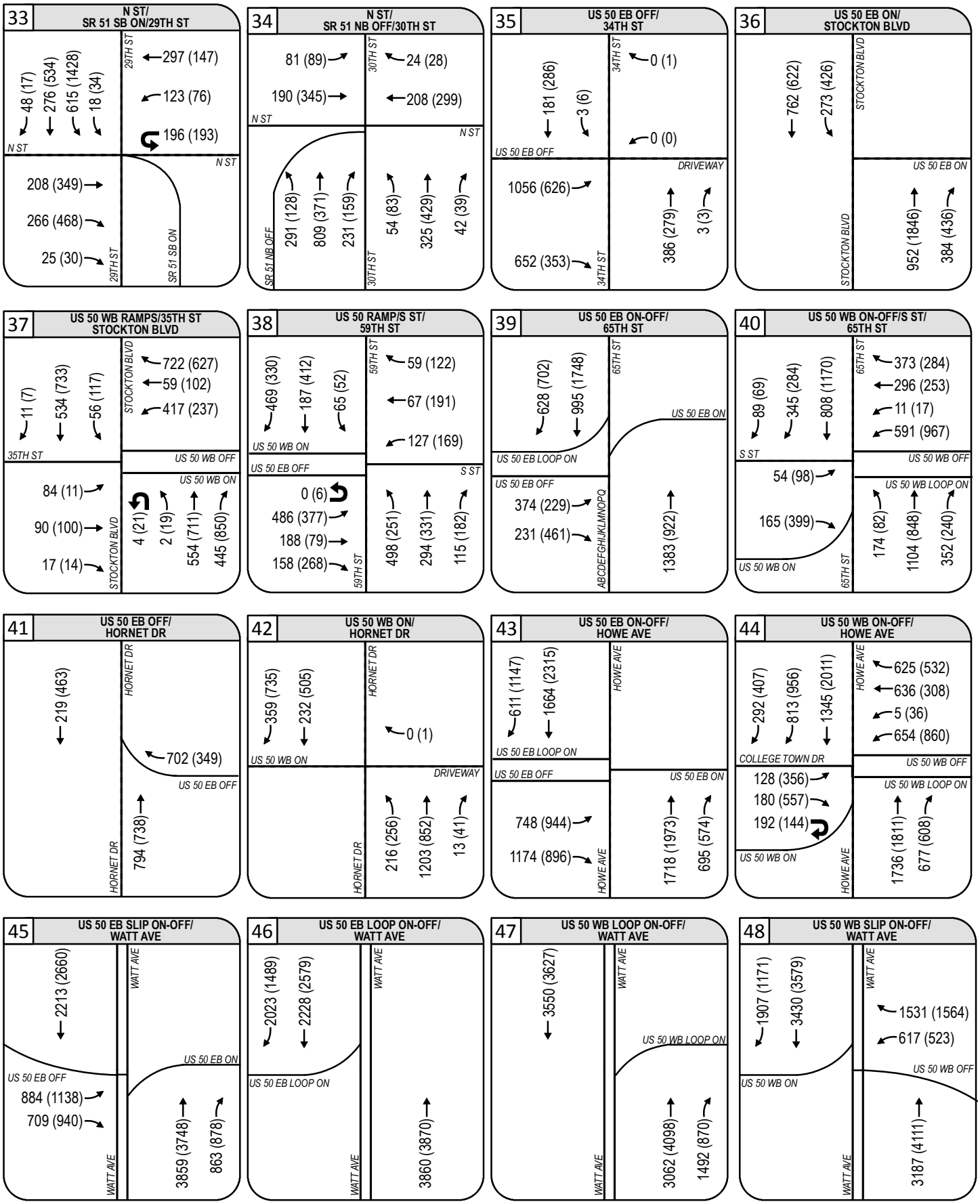


OPTION 1 - YEAR 2040 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-A-2 (CONTINUED)



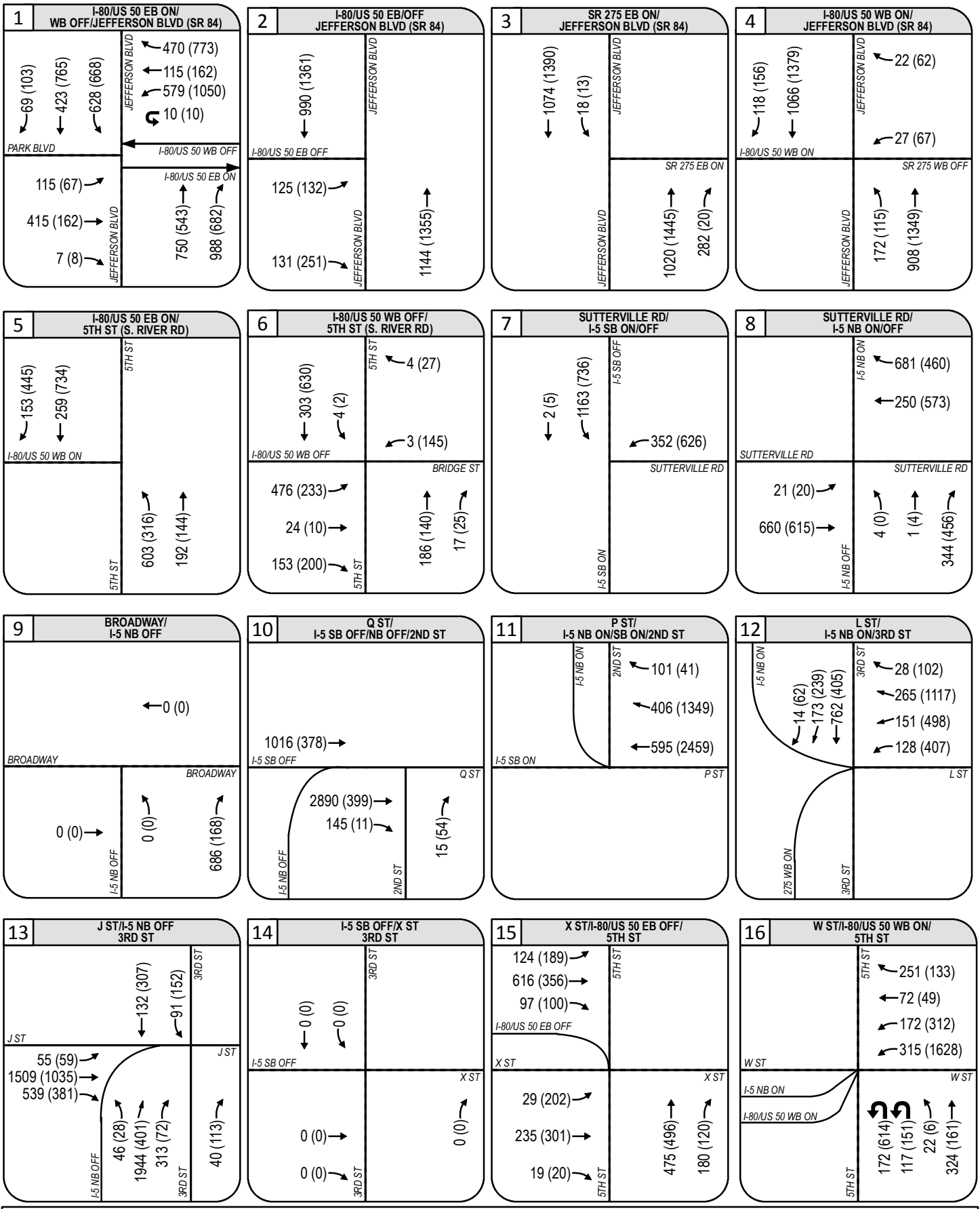
OPTION 1 - YEAR 2040 - ADD HOV LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-A-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



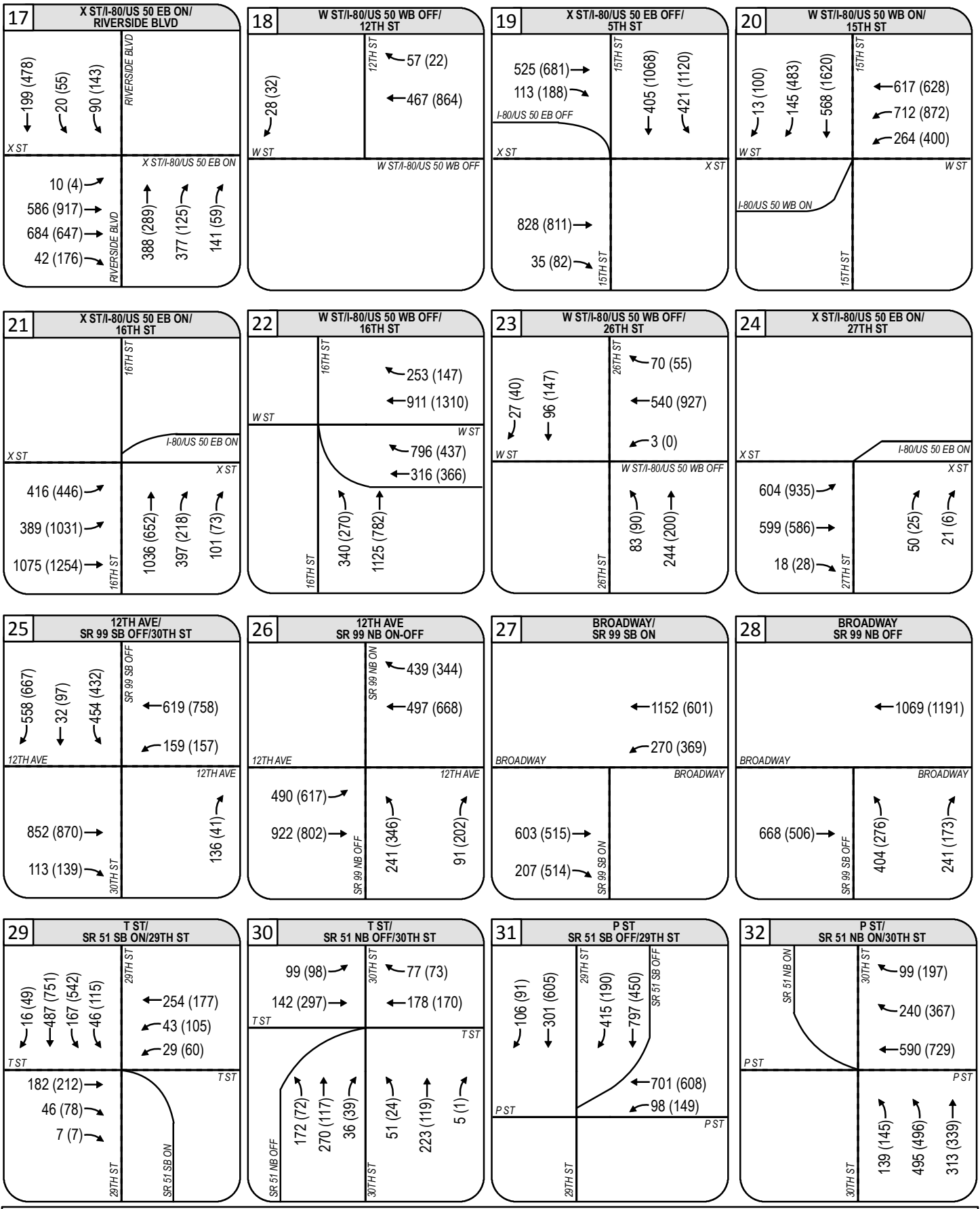
OPTION 1 - YEAR 2040 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-B-1

DEVELOPING INNOVATIVE DESIGN SOLUTIONS



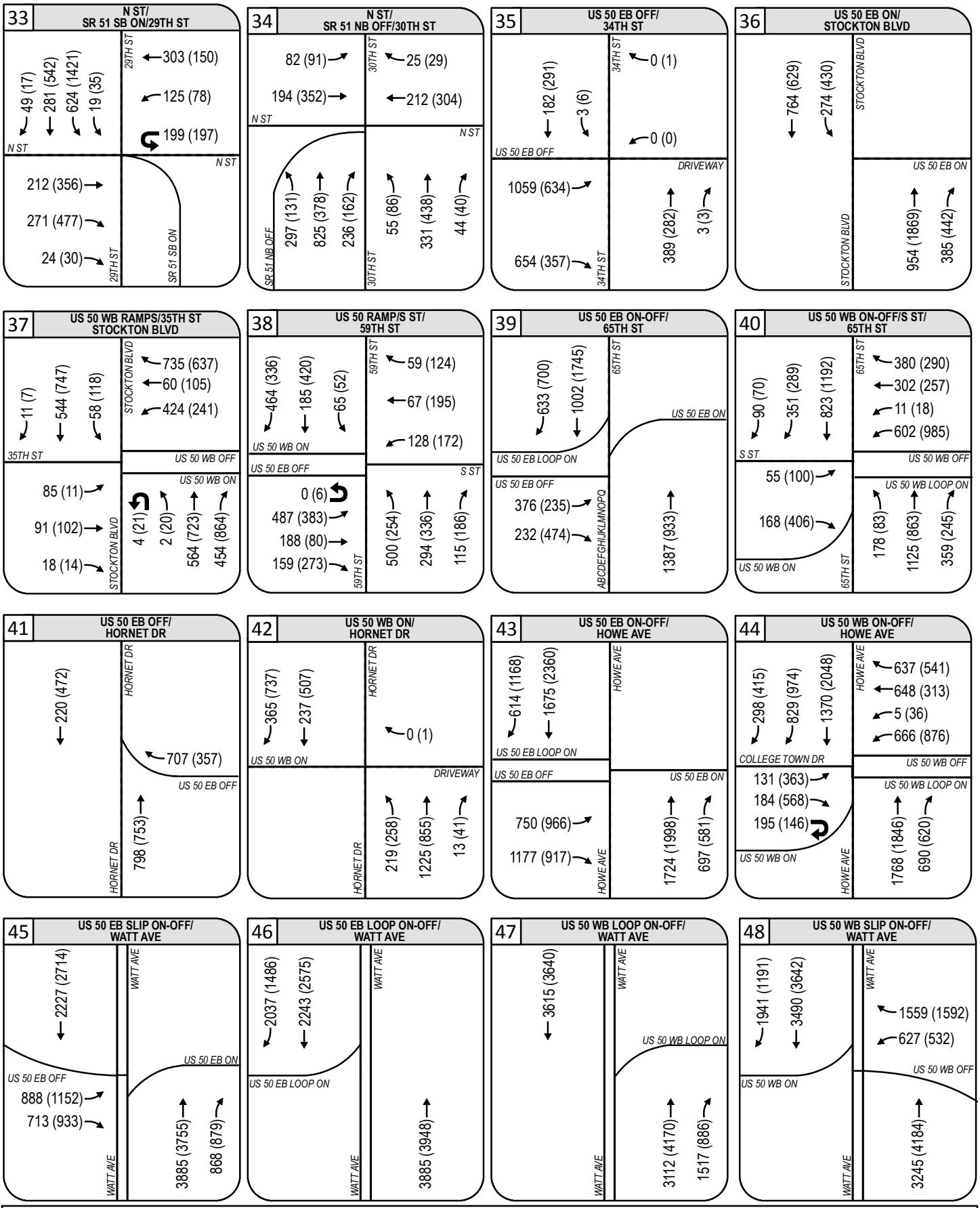
OPTION 1 - YEAR 2040 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-B-2 (CONTINUED)

DEVELOPING INNOVATIVE DESIGN SOLUTIONS



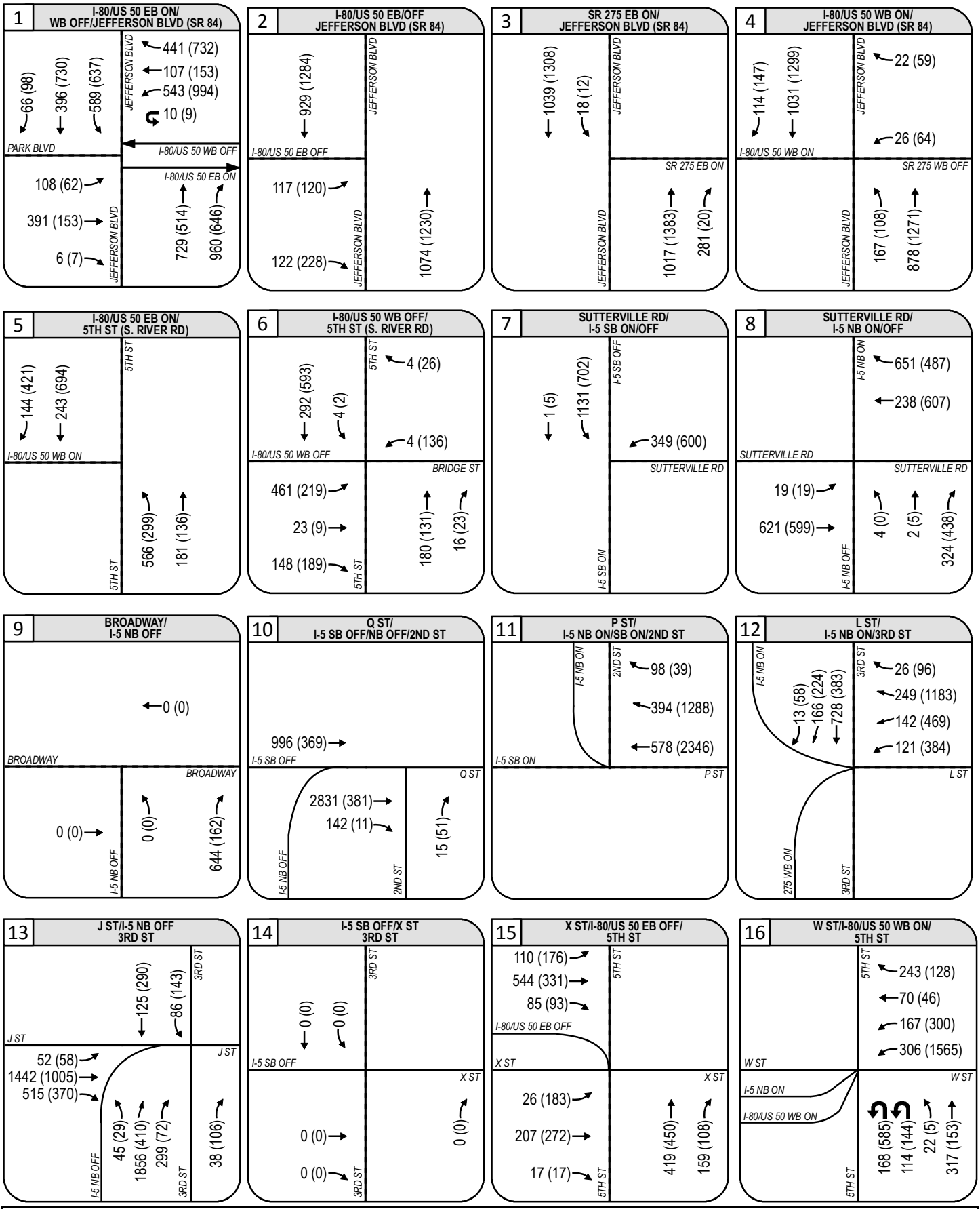
OPTION 1 - YEAR 2040 - ADD MIXED FLOW LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-B-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



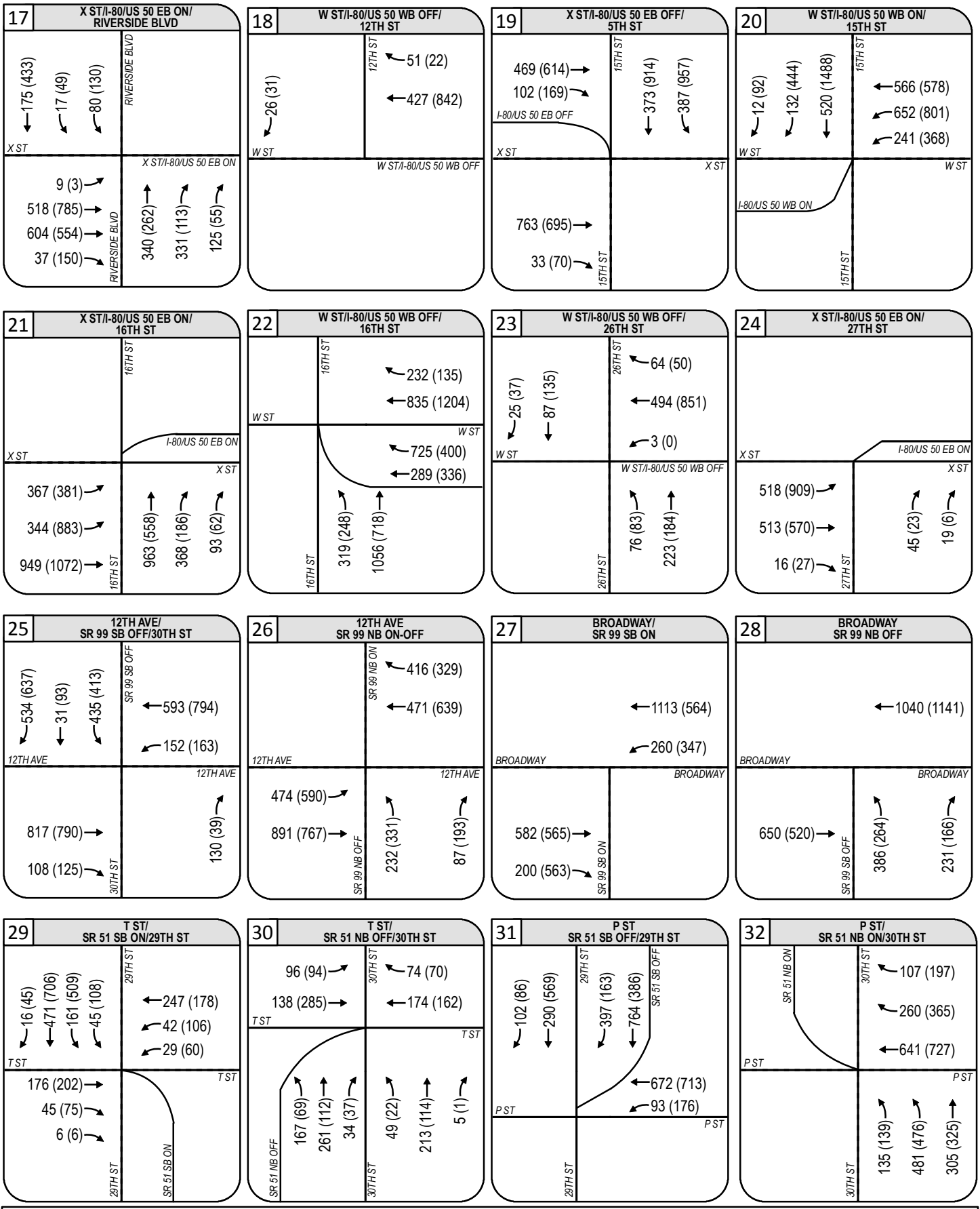
OPTION 1 - YEAR 2040 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-C-1

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

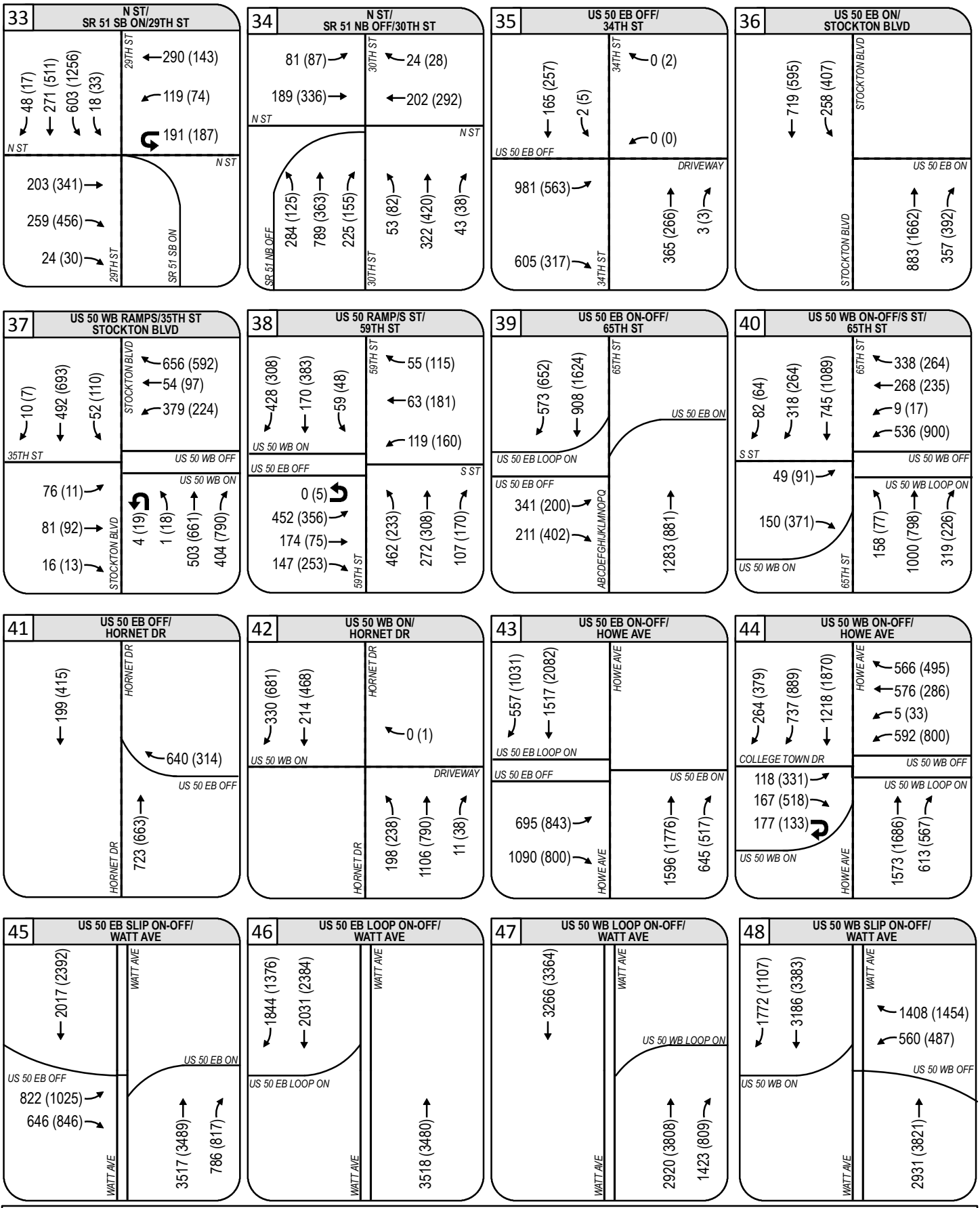


OPTION 1 - YEAR 2040 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-C-2 (CONTINUED)



OPTION 1 - YEAR 2040 - TAKE-A-LANE

PEAK HOUR INTERSECTION TURNING MOVEMENT VOLUMES

CALTRANS DISTRICT 3 TASK ORDER NO. 1 - US 50 HOV LANE PROJECT

FIGURE 7-C-3 (CONTINUED)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

APPENDIX E

Traffic Operations

The Traffic Report prepared for this project analyzed traffic operations of the four alternatives under future year 2040 peak period conditions. The overall findings are summarized below.

Table 2-18 summarizes the projected change in year 2040 AM and PM 4-hour peak period performance measures, for the entire US 50 HOV Lanes Project study area network, for each project alternative as compared to No Build (Alternative 4) conditions.

Table 2-18. Year 2040 4-hour Peak Period Network Summary

	Performance Measure	Change in Performance Measure vs. No Build			
		Alt. 1 - Add HOV Lane	Alt. 2 - Add Mixed Flow Lane	Alt. 3 - Take-a-Lane	Alt. 4 - No Build
AM Peak Period	Vehicles Served (vehicles)	+6,500	+10,500	-13,000	0
	Persons Served (persons)	+31,000	+16,500	-2,500	0
	Person Miles of Travel	+109,000	+73,000	-41,000	0
PM Peak Period	Vehicles Served (vehicles)	+11,000	+7,000	-15,500	0
	Persons Served (persons)	+40,000	+11,000	-6,500	0
	Person Miles of Travel	+145,500	+82,500	-57,000	0

As shown in Table 2-18, the Add HOV Lane and Add Mixed Flow Lane alternatives (Alternatives 1 and 2) are projected to serve significantly more vehicles than the No Build alternative under year 2040 AM and PM peak period conditions. The Add Mixed Flow Lane alternative is projected to serve the most vehicles under AM Peak Period conditions (10,500 more vehicles than No Build), but the Add HOV Lane alternative is projected to consistently serve the most persons overall (31,000 more persons than No Build under AM peak period conditions, and 40,000 more persons than No Build under PM peak period conditions). The Add HOV Lane alternative also accommodates the largest amount of person-miles of travel of any of the four alternatives within the US 50 HOV Lanes Project study area (over 100,000 more person-miles of travel than No Build under both AM and PM peak period conditions). The Take-a-Lane alternative (Alternative 3) is projected to serve the least vehicles and persons of all the alternatives.

Table 2-19 shows the projected change in average 2040 eastbound US 50 travel times during the AM and PM 4-hour peak periods for each project alternative as compared to No Build (Alternative 4) conditions.

Table 2-19. Year 2040 4-Hour Peak Period Travel Times (EB US 50)

	Travel Time Route	Change in Travel Time vs. No Build (minutes)			
		Alt. 1	Alt. 2	Alt. 3	Alt. 4
AM Peak	1: SB I-5 at Richards Blvd to EB US 50 at Watt Ave	+0.5	0.0	+1.5	0.0
	3: EB I-80 at West Sacramento to EB US 50 at Watt Ave	+0.5	+0.5	+0.5	0.0
	5: NB I-5 at Sutterville Rd to EB US 50 at Watt Ave	0.0	0.0	+1.5	0.0

	7: NB SR 99 at 12th Ave to EB US 50 at Watt Ave	0.0	-1.0	+4.0	0.0
	9: SB US 51 at E St to EB US 50 at Watt Ave	0.0	0.0	+0.5	0.0
PM Peak Period	1: SB I-5 at Richards Blvd to EB US 50 at Watt Ave	0.0	+1.5	+9.0	0.0
	3: EB I-80 at West Sacramento to EB US 50 at Watt Ave	+1.0	+1.5	+5.5	0.0
	5: NB I-5 at Sutterville Rd to EB US 50 at Watt Ave	-1.5	-1.5	+10.0	0.0
	7: NB SR 99 at 12th Ave to EB US 50 at Watt Ave	+1.0	+2.0	+11.0	0.0
	9: SB US 51 at E St to EB US 50 at Watt Ave	0.0	+1.0	+7.0	0.0

The Add HOV Lane and Add Mixed Flow Lane alternatives (Alternatives 1 and 2) are projected to have little impact on eastbound travel times over No Build (Alternative 4) conditions. Add HOV Lane and Add Mixed Flow Lane AM and PM peak period travel times are generally projected to either stay the same or increase/decrease by up to two (2) minutes. The Take-a-Lane alternative (Alterative 3) travel times are generally projected to increase over projected No Build travel times, with PM peak period routes projected to increase by as much as 11 minutes. Traffic demand is projected to exceed freeway capacity under year 2040 conditions. The resulting mainline traffic queues that form under No Build (Alternative 4) conditions were projected to stretch beyond the modeled limits, resulting in vehicles experiencing a significant amount of delay waiting to enter the model network. The delay/travel time experienced by vehicles waiting to enter the study network was not entirely captured in the above results due to limitations of the model. Note that most of the travel time benefits due to the proposed project occur in the westbound direction under year 2040 conditions.

Table 2-20 shows the projected change in average 2040 AM and PM peak hour volume served, persons served, speed, and density of eastbound US 50 in the project corridor for each project alternative as compared to No Build (Alternative 4) conditions.

Table 2-20. Year 2040 Peak Hour Project Corridor Performance (EB US 50)

	Performance Measures	**Change in Performance Measure vs. No Build**			
		Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
AM Peak Hour	Volume Served (vehicles)	+150	+250	-350	0
	Persons Served (persons)	+700	+350	-150	0
	Average Mainline Speed (mph)	0.0	0.0	-2.5	0.0
	Average Density (pcplpm)	-2.5	-2.0	+1.0	0.0
PM Peak Hour	Volume Served (vehicles)	+200	+200	-700	0
	Persons Served (persons)	+700	+300	-700	0
	Average Mainline Speed (mph)	+1.0	+1.0	-5.5	0.0
	Average Density (pcplpm)	-3.0	-3.0	-0.5	0.0

The eastbound US 50 project corridor is projected to serve several hundred more peak hour vehicles and persons with lower mainline densities under the Add HOV Lane and Add Mixed Flow Lane alternatives (Alternatives 1 and 2) than under No Build (Alternative 4) conditions. The Take-a-Lane alternative (Alternative 3), however, is projected to result in less vehicles and persons served, lower eastbound US 50 speeds, and higher eastbound US 50 mainline densities.

Table 2-21 shows the projected change in average 2040 westbound US 50 travel times during the AM and PM 4-hour peak periods for each project alternative as compared to No Build (Alternative 4) conditions.

Table 2-21. Year 2040 4-Hour Peak Period Travel Times (WB US 50)

	Travel Time Route	Change in Travel Time vs. No Build (minutes)			
		Alt. 1	Alt. 2	Alt. 3	Alt. 4
AM Peak Period	2: WB US 50 at Watt Ave to NB I-5 at Richards Blvd	+2.5	+3.5	+1.0	0.0
	4: WB US 50 at Watt Ave to WB I-80 at West Sacramento	+2.0	+3.0	+1.0	0.0
	6: WB US 50 at Watt Ave to SB I-5 at Sutterville Rd	+2.0	+3.0	+1.0	0.0
	8: WB US 50 at Watt Ave to SB SR 99 at 12th Ave	+2.0	+3.0	+0.5	0.0
	10: WB US 50 at Watt Ave to NB US 51 at E St	+3.5	+5.0	+0.5	0.0
PM Peak Period	2: WB US 50 at Watt Ave to NB I-5 at Richards Blvd	-5.5	-7.5	-3.5	0.0
	4: WB US 50 at Watt Ave to WB I-80 at West Sacramento	-7.0	-9.5	-4.5	0.0
	6: WB US 50 at Watt Ave to SB I-5 at Sutterville Rd	-5.5	-8.5	-5.0	0.0
	8: WB US 50 at Watt Ave to SB SR 99 at 12th Ave	-7.0	-9.5	-2.0	0.0
	10: WB US 50 at Watt Ave to NB US 51 at E St	-4.0	-7.0	-3.0	0.0

The Add HOV Lane and Add Mixed Flow Lane alternatives (Alternative 1 and 2) have slightly higher westbound travel times than the other alternatives under AM peak period conditions. However, under PM peak period conditions, the Add HOV Lane alternative is projected to decrease westbound travel times by up to approximately 7 minutes, and the Add Mixed Flow Lane alternative is projected to decrease westbound travel times by up to nearly 10 minutes, when compared to No Build (Alternative 4) conditions. Traffic demand is projected to exceed freeway capacity under year 2040 conditions. The resulting mainline traffic queues that form under No Build (Alternative 4) conditions were projected to stretch beyond the modeled limits, resulting in vehicles experiencing a significant amount of delay waiting to enter the model network. The delay/travel time experienced by vehicles waiting to enter the study network was not entirely captured in the above results due to limitations of the model.

Based on review of the models, the Add HOV Lane and Add Mixed Flow Lane alternatives have the shortest travel times and serve the most vehicles before the peak hour (7:30 AM - 8:30 AM

or 4:30 PM – 5:30 PM) occurs. Once the peak hour occurs, the Add HOV Lane and Add Mixed Flow Lane alternatives have the longest overall travel times in some cases. This is the result of chokepoints in the models becoming more severe under the Add HOV Lane and Add Mixed Flow Lane alternatives. The higher project area throughput of the Add HOV lane and Add Mixed Flow Lane alternatives enables more cars to get to the network chokepoints in a shorter amount of time, which causes queuing to increase at a faster rate than the other alternatives and negatively impacts travel times. If future chokepoint/bottleneck improvements within and outside the study segments are implemented, the Add HOV Lane and the Add Mixed Flow Lane alternatives will continue to provide better travel times over the No Build and Take-a-Lane alternative.

Major westbound US 50 chokepoints include the weaving section between SR 51/99 connectors and 16th Street (caused by merging vehicles), the weaving section between the 15th Street on-ramp and the I-5 connectors (caused by merging vehicles), and spillback from the connectors to NB SR 51 and SB SR 99 (NB SR 51 and SB SR 51 both experience low speeds and high queuing under year 2040 PM peak period conditions).

The Take-a-Lane alternative sometimes shows decreased travel times compared to No Build conditions due to bottlenecks forming at the edges of the study area where the proposed reduction in capacity for mixed use vehicles would begin. When these bottlenecks form, cars spend a significant amount of time waiting to enter the US 50 project corridor, which is not entirely captured by the study area models as the resulting queues extend outside of the modeled limits.

Table 2-22 shows the projected change in average 2040 PM peak hour volume served, persons served, speed, and density of westbound US 50 in the project corridor for each project alternative as compared to No Build (Alternative 4) conditions.

Table 2-22. Year 2040 Peak Hour Project Corridor Performance (WB US 50)

	Performance Measures	Change in Performance Measure vs. No Build			
		Alt. 1	Alt. 2	Alt. 3	Alt. 4
AM Peak Hour	Volume Served (vehicles)	-100	+100	-900	0
	Persons Served (persons)	+400	+200	-900	0
	Average Mainline Speed (mph)	-1.0	-3.0	-0.5	0.0
	Average Density (pcplpm)	-3.5	+1.0	-5.0	0.0
PM Peak Hour	Volume Served (vehicles)	+800	+1,400	-400	0
	Persons Served (persons)	+1,600	+1,900	-300	0
	Average Mainline Speed (mph)	+5.0	+5.0	+7.0	0.0
	Average Density (pcplpm)	-5.0	-1.0	-12.0	0.0

The westbound US 50 project corridor is projected to serve several hundred more persons with lower mainline densities under the Add HOV Lane alternative (Alternative 1) than under No Build conditions during the AM hour. The Add Mixed Flow Lane alternative (Alternative 2) is projected to serve several hundred more people with slightly higher densities than No Build during the AM peak hour. The Take-a-Lane alternative (Alternative 3), however, is projected to

result in less vehicles and persons served and lower westbound US 50 speeds and densities under AM peak hour conditions. During the PM peak hour, the westbound US 50 project corridor is projected to serve 800-1,400 more vehicles and 1,600-1,900 more persons under the Add HOV Lane and Add Mixed Flow Lane alternatives than under No Build conditions. The Add HOV Lane and Add Mixed Flow Lane alternatives are also projected to increase average westbound US 50 speeds by five (5) miles per hour and decrease the average mainline density during the PM peak hour. The Take-a-Lane alternative is projected to result in less vehicle served and persons served under PM peak hour conditions.

The Take-a-Lane alternative shows increased average westbound mainline speeds under year 2040 PM peak hour conditions and decreased densities under year 2040 AM and PM peak hour conditions when compared to the No Build alternative. This is the result of bottlenecks for different scenarios forming at different locations. Due to the increased capacity of westbound US 50 in the project corridor, the add-a-lane alternatives bottleneck at the W-X section of US 50, while the No Build and Take-a-Lane alternatives bottleneck closer to the eastern edge of the project corridor. This sometimes leads to less volumes traveling through the project area under the Take-a-Lane alternative, as much of the traffic is waiting to enter the project corridor. Since there are less volumes in the project corridor, the vehicles in the corridor experience higher speeds and lower densities.

It is important to note that the year 2040 PM peak period network contains a significant amount of congestion and mainline queuing due to the high volumes entering the system and the bottlenecks that form. The major W-X bottlenecks occur on eastbound and westbound US 50 between the SR 51/99 connectors and the I-5 connectors. Westbound and eastbound US 50 between the SR 51/99 connectors and the I-5 connectors is a major weave section where cars simultaneously merge (enter) onto US 50 mainline from SR 99/51, I-5, and 15th/16th Street on-ramps and US 50 mainline diverge (exit) to I-5 connectors, SR 99/51 connectors and 15th/16th Street off-ramps.

These freeway segments back up under existing conditions, and the congestion becomes more severe under 2040 conditions. The weave sections become overloaded and vehicles begin to back up on mainline US 50 as they wait for merge/diverge vehicles. Eventually, most of the US 50 lanes within the W-X section become congested with queued vehicles.

Since the Add HOV Lane and Add Mixed Flow lane alternatives serve more vehicles on mainline US 50, backups at the described bottlenecks begin sooner, leading to decreased speeds and increased delays in certain locations. As a result of the high levels of traffic demand attempting to use the freeway network under year 2040 conditions, the differences in operations between the alternatives become smaller and more difficult to capture with the model.

The following is a summary of year 2040 conditions traffic operations for the four alternatives analyzed for the US 50 HOV Lanes Project:

- Alternative 1 (Add HOV Lane) is generally projected to serve the most persons and the second most vehicles of the four alternatives. The Add HOV Lane alternative also is projected to have similar, sometimes better, speeds and densities through the project corridor to the other alternatives and to provide some decreased travel times over No Build conditions.

- Alternative 2 (Add Mixed Flow Lane) is generally projected to serve the most vehicles and the second most persons of the four alternatives. The Add Mixed Flow Lane alternative also is projected to have similar, sometimes better, speeds and densities

through the project corridor to the other alternatives and to provide some decreased travel times over No Build conditions.

- Alternative 3 (Take-a-Lane) would encourage more people to utilize high occupancy vehicles but would slightly decrease capacity of the US 50 project corridor from No Build conditions. The Take-a-Lane alternative is generally projected to serve the least vehicles and persons of the four alternatives. The Take-a-Lane alternative is also generally projected to have the lowest speeds, highest densities, and highest travel times on eastbound US 50 under AM and PM peak hour conditions. The Take-a-Lane alternative is also projected to create the worst bottleneck for traffic entering the project corridor.

- Alternative 4 (No Build) would not reduce peak period congestion as it would not change capacity of the US 50 project corridor. The No Build alternative is projected to have generally low speeds and high delays and travel times throughout the US 50 project corridor. Bottlenecks are projected to form throughout the project corridor, adding to delays.

According to the US Department of Transportation, travel time is worth about 50% of the hourly median wage (USDOT 2011). According to the State Employment Development Department, the mean hourly wage in the Sacramento MSA in the first quarter of 2014 was $25.21, for an hourly travel time value of $12.60.

Traffic Congestion Impacts

By year 2040 conditions, the *VISSIM* models project significant traffic congestion build-up from upstream and downstream segments that impact US 50 HOV study corridor traffic operations. "Bottlenecks" are projected to form at various points in the modeled roadway network, both outside and through the US 50 project corridor, that either block a portion of upstream traffic from entering the study corridor or block a portion of the downstream traffic from departing the study corridor. This section outlines the major bottlenecks that are observed within the year 2040 microsimulation models and the effects that these bottlenecks have on the operational analysis of the proposed US 50 HOV project corridor.

Eastbound US 50: There are two major bottlenecks that occur on eastbound US 50 during the AM and PM four-hour peak periods. The first occurs at the W-X section of EB US 50. Eastbound traffic to the SB SR 99 / NB SR 51 connector backs up mainline eastbound US 50 and eventually begins to block the majority of eastbound US 50 lanes along the W-X section. The backup from this first bottleneck spills back and exacerbates the second bottleneck, which occurs at the section of W-X eastbound US 50 where traffic from the "NB/SB I-5 to EB US 50" connectors merge with mainline EB US 50 traffic and traffic heading to/from 15/16th Street on/off-ramps. This weaving section creates queuing that backs up the "NB and SB I-5 to EB US 50" connectors as well as eastbound US 50 through West Sacramento. The queuing from these bottlenecks creates a chokepoint in the W-X section of eastbound US 50 that limits the number of vehicles that can enter the eastbound US 50 project corridor during the AM and PM peak periods.

Westbound US 50: Westbound US 50 contains three closely spaced locations where major bottlenecks occur during the AM and PM four-hour peak periods. The three locations are: westbound US 50 between the Stockton Boulevard interchange and the "WB US 50 to NB SR 51 / SB SR 99" connectors, westbound US 50 between the "NB SR 99 / SB SR 51 to WB US 50" connectors and 16th Street off-ramp, and westbound US 50 between the 15th Street on-ramp and "WB US 50 to I-5" connectors. The capacities of these three weave segments are overloaded during the 2040 AM and PM four-hour peak periods and significant westbound

queuing builds up as a result. The year 2040 queuing from these chokepoints backs up through the project corridor to Watt Avenue before eventually beginning to disperse. This queuing causes low speeds, high densities, and long travel times through the US 50 project corridor.

Due to high demand volumes during the year 2040 four-hour PM peak period, the queues from the westbound US 50 bottlenecks extend to the eastern limits of the model and do not completely clear up during the four-hour peak period. As a result, not all demand volumes are able to be served. Note that it is common for the roadway networks in future year microsimulation models to be unable to serve all of the projected demand, especially in built-out areas such as downtown Sacramento. Every roadway facility has a certain maximum capacity it can serve, and the further into the future the modeled scenario gets, the more likely it becomes that the demand will exceed network capacity.

Outside the Project Corridor: Some locations outside of the US 50 project corridor are also projected to experience bottlenecks in the year 2040 VISSIM models:

- **Southbound I-5** bottlenecks at the "SB I-5 to EB/WB US 50" connectors. This causes queuing on southbound I-5 that backs up to the northern limits of the model. As a result, southbound I-5 is unable to serve all of the demand volumes during the 2040 AM and PM four-hour peak periods.
- **Northbound SR 99** bottlenecks at the "NB SR 99 / 12th Avenue" interchange and the NB SR 99 connectors to EB/WB US 50. This causes queuing that backs up to the southern limits of the model. As a result, northbound SR 99 is unable to serve all of the demand volumes during the 2040 AM and PM four-hour peak periods.
- **Southbound SR 99** bottlenecks near the connectors from EB/WB US 50 due to high EB/WB US 50 demands to SB SR 99. This results in queues that spill back to EB/WB US 50 and SB SR 51.
- **Northbound SR 51** bottlenecks near the E Street on-ramp due to the mainline reducing to three lanes. This results in queues that spill back to the US 50 connectors and contributes to eastbound and westbound US 50 queuing/chokepoints.
- **Southbound SR 51** bottlenecks at the "SB SR 51 to EB/WB US 50" connectors due to spillback from congestion on the W-X segments of WB US 50. This causes queuing that backs up to the northern limits of the model and prevents SB SR 51 from serving all of the demand volumes during the 2040 AM and PM peak four-hour periods.
- **Eastbound US 50** east of the project area (east of Watt Avenue) currently experiences delays and queue spill back from congestions associated with eastbound US 50 traffic reaching overcapacity conditions. Based on experience with the project area and outside of project area, this queue spill back is projected to continue to increase and spillback to the project area in the future.

Interchanges: Bottlenecks are also caused by overloaded on/off-ramps and overcrossing ramp intersections extended beyond their capacity within the study area. The following major interchange related bottlenecks were observed in the year 2040 four-hour AM and PM peak period models:

- **Watt Avenue:** The EB/WB US 50 on-ramps at Watt Avenue experience significant backup due to the previously mentioned queuing on WB US 50 and the Watt Avenue overcrossing reaching its capacity under year 2040 four-hour AM and PM peak period

conditions. This causes both southbound and northbound Watt Avenue to experience significant queuing. Two major problems arise from the backups on Watt Avenue: 1. Vehicles on southbound Watt Avenue are unable to reach the eastbound US 50 loop on-ramp; 2. Vehicles queued on northbound Watt Avenue prevent vehicles on the eastbound US 50 direct off-ramp from turning left, which leads to queue spillback onto eastbound mainline US 50.

- **Howe Avenue:** Howe Avenue experiences interchange queuing similar to Watt Avenue. The EB/WB US 50 on-ramps at Howe Avenue also experience significant backup due to the previously mentioned queuing on WB US 50 and the Howe Avenue overcrossing reaching its capacity under year 2040 four-hour AM and PM peak period conditions. This causes both southbound and northbound Howe Avenue to experience significant queuing. Two major problems arise from the backups on Howe Avenue: 1. Vehicles on southbound Howe Avenue are unable to reach the eastbound US 50 loop on-ramp, 2. Vehicles queued on northbound Howe Avenue prevent vehicles on the eastbound US 50 direct off-ramp from turning left, which leads to queue spillback onto eastbound mainline US 50.

- **34th Street Off-Ramp:** The high traffic volumes utilizing the eastbound US 50 34th Street off-ramp cause queuing that spills back onto the eastbound US 50 mainline. Increasing the green time for the eastbound US 50 off-ramp intersection movement helps alleviate some of the spill back onto EB US 50 mainline. However, even with the increased green time, the 34th Street off-ramp intersection is still unable to serve all SB SR 51 and EB US 50 off-ramp to 34th Street traffic demands under 2040 conditions. As a result, traffic spills back to the SB SR 51 connector and EB US 50 mainline. This queue spillback adds to the eastbound US 50 queuing that prevents vehicles from entering the project corridor.

Operations of Year 2040 Scenarios: The US 50 project corridor (eastbound and westbound) has more throughput and demand under the Add HOV Lane and Add Mixed Flow Lane alternatives than under the No Build and Take-a-Lane alternatives. Therefore, the Add HOV Lane and Add Mixed Flow Lane eastbound/westbound US 50 traffic operations between I-5 and Watt Avenue are generally better than No Build and Take-a-Lane traffic operations during the 3:00 PM to 4:30/5:00 PM and 6:00 AM to 7:30/8:00 AM time periods. However, because of the increased throughput/demand of the project corridor, vehicles reach the major network bottlenecks in larger quantities and at a faster rate under the Add HOV Lane and Add Mixed Flow Lane alternatives. As a result, queuing in the 2040 Add HOV Lane and Add Mixed Flow Lane alternatives develops at the discussed critical locations at a faster rate and causes the Add HOV Lane and Add Mixed Flow Lane networks to have slightly worse traffic operations (longer travel times, lowers speeds, and higher delays) than the No Build and Take-a-Lane alternatives beyond 4:30/5:00 PM and 7:30/8:00 AM. This is why The Add HOV Lane and Add Mixed Flow Lane alternatives almost always serve more vehicles and persons than the No Build and Take-a-Lane alternatives, but sometimes have longer travel times.

Vehicle Miles Traveled (VMT) Analysis

VMT data for each proposed alternative was developed for both the US 50 HOV Lanes traffic study as well as for air quality and greenhouse gas emissions analysis. Projected year 2040 VMT was calculated for the entire US 50 study area. Additionally, VMT on the project segment of mainline US 50 was calculated and sorted into five mile-per hour “speed bins”. Year 2040 mainline US 50 VMT by speed bins in the project corridor is shown in Table 2-23.

Table 2-23. Year 2040 US 50 Mainline VMT by Speed Bin

Speed Bin	Alternative 1	Alternative 2	Alternative 3	Alternative 4
0 – 5 mph	0	0	0	0
5 – 10 mph	0	0	0	0
10 – 15 mph	0	0	0	0
15 – 20 mph	0	0	0	0
20 – 25 mph	35,993	35,997	35,510	35,512
25 – 30 mph	94,389	94,423	70,255	74,009
30 – 35 mph	70,752	84,029	58,465	139,004
35 – 40 mph	79,323	134,160	245,901	516,036
40 – 45 mph	219,852	336,428	380,571	445,486
45 – 50 mph	498,019	549,186	579,666	541,603
50 – 55 mph	447,342	472,716	484,683	327,806
55 – 60 mph	567,295	431,207	408,821	358,594
60 – 65 mph	600,349	544,994	322,288	179,516
65+ mph	117,456	50,303	16,007	0
Total	**2,730,769**	**2,733,443**	**2,602,167**	**2,617,566**

As shown in Table 2-23, Alternatives 1 and 2 (the add-a-lane alternatives) are projected to have the highest levels of overall VMT. This is consistent with the concept of induced demand discussed earlier, which predicted that the alternatives with the most capacity (i.e. the add-a-lane alternatives) would have the most demand for travel. Additionally, Alternatives 1 and 2 are projected to experience a higher percentage of VMT at higher speeds. Alternative 3 (Take-a-Lane) would experience the least VMT overall and some of the lowest speeds due to its decreased capacity. In general, freeway facilities are able to serve more vehicles with fewer emissions when they are operating at higher speeds due to larger capacities. Generally, the least pollutants and greenhouse gasses are produced when vehicles are operating between 45 and 55 miles per hour on a freeway.

HOV Lane Safety Data

The US 50 HOV lanes traffic study included a discussion of the effects that adding HOV lanes to an existing freeway segment has on traffic safety and accident rates (see page 79 of the US 50 HOV Lane traffic study). The discussion utilized the following available TSAR traffic accident data records and TASAS accident data summaries provided by Caltrans District 3 for the following US 50 locations and time periods:

- East of the US 50 project segment, between Watt Avenue (03 SAC 050 PM R005.055) and east of Sunrise Boulevard (03 SAC 050 PM 013.498) **before** construction of the eastbound and westbound HOV lanes, for the three-year data period (January 1, 2007 to December 31, 2009).

- East of the US 50 project segment, between Watt Avenue (03 SAC 050 PM R005.055) and east of Sunrise Boulevard (03 SAC 050 PM 013.498) **after** the construction of the

eastbound and westbound HOV lanes, for the most recent 27-month data period (January 1, 2011 to March 31, 2013). Note: 27 months of data was used instead of 36 months of data because at the time of completion of the Traffic Study, accident data was only available up until March 2013 (i.e. 27 months since the completion of the HOV lanes east of Watt Avenue).

The before and after HOV lanes accident data is summarized in Table 2-24.

Table 2-24. Accident Data Summary – US 50 from Watt Avenue to Sunrise Boulevard

US 50 Segment Location (Post Mile)	Number of Accidents							Persons		Actual Accident Rates (# of accidents/MVM)			Average Accident Rates (# of accidents/ MVM)		
	Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark	Kld	Inj	Fat	F+I	Tot	Fat	F+I	Tot
Before HOV Lanes 36-Month 01-JAN-07 to 31-DEC-09 (PM 5.055 to PM 13.497)	683	3	220	223	523	75	198	3	304	0.002	0.12	0.37	0.004	0.27	0.84
After HOV Lanes 27-Month 01-JAN-11 to 31-MAR-13 (PM 5.055 to PM 13.497)	657	1	198	199	550	68	191	1	281	0.002	0.19	0.61	0.003	0.21	0.68
Note: *MVM = Million Vehicle Miles, Fat = Fatalities, Inj = Injuries, Veh = Vehicle, Kld = Killed, F+I = Fatalities + Injuries, Tot = Total* *Source: Caltrans District 3*															

For the segment of US 50 east of the project segment (between Watt Avenue and Sunrise Boulevard) actual accident rates were less than that of average accident rates for “fatal”, “fatal plus injury” and total accidents both before and after the installation of the eastbound and westbound HOV lanes. With the construction of the eastbound and westbound HOV lanes east of the project segment, the “fatal” type accident rate did not change, but the “fatal plus injury” and the “total” accident rates increased from 0.12 and 0.37 to 0.19 and 0.61, respectively. However, this could be a result of the different time periods for the “before” and “after” data records.

The “before” and “after” construction of the HOV lanes traffic collision records for US 50 east of the project segment were reviewed according to the following categories:

- Type of collision - head on, sideswipe, rear end, broadside, hit object, etc.
- Primary collision factor - follow too close, failure to yield, improper turn, speeding, etc.
- Movement preceding collision - proceeded straight, slowing/stopping, changing lane, etc.
- Time of day - peak period (HOV in effect) versus off-peak period (HOV not in effect)
- Location of collision - left lane, interior lane, right lane, etc.

With the construction of HOV lanes, the number of accidents caused by speeding increased by approximately 14% within the segment of US 50 between Watt Avenue and Sunrise Boulevard. Rear end accidents also increased by approximately 12% within the same segment. The locations of accidents on the mainline stayed approximately the same, with approximately 25% of accidents occurring in the left lane, 25% of accidents occurring in the right lane, 40% of

accidents occurring in the interior lanes, and the remaining 10% of accidents occurring in the shoulder or median areas.

Based on the data above, there is the potential for accident rates of certain types to increase with construction of HOV lanes in the project area. However, since the proportion of accident locations on the mainline stayed basically the same (i.e. the number of accidents in the left lane did not increase), it cannot be definitively concluded that the presence of HOV lanes caused an increase in accident rates. The accident rates in the data area could have slightly increased over time due to other factors such as increased congestion, small sample size, etc.

As mentioned in prior HOV reports prepared for Caltrans District 3 (*Contiguous HOV Lane Safety Review,* dated 2006*, I-5 Bus/Carpool Lanes Traffic Report,* dated September 30, 2009), recent research studies in other states have reported higher accident rates associated with HOV lanes on freeways. However, the studies focused on buffer or barrier-separated facilities, which have accident concentrations at ingress/egress locations. A buffer or barrier-separated facility contains a HOV lane that is separated from the mixed flow lanes by a striped buffer width of one foot or more or physical barrier; ingress/egress is only allowed at specific points.

The proposed US 50 HOV lanes are a continuous HOV facility, not a buffer or barrier-separated facility. A continuous HOV lane is only separated from mixed flow lanes by a single stripe and ingress/egress is permitted for the entire length. For continuous HOV lanes, safety concerns exist due to the speed difference between the freely flowing HOV lane and the adjacent congested mixed-flow lanes. However, a study titled *"A Comparative Safety Study of Limited versus Continuous Access High Occupancy Vehicle (HOV) Facilities" (Institute of Transportation Studies, University of California, Berkeley, September 18, 2007)* found that continuous access HOV lanes had a lower percentage of total collisions than limited access (buffer or barrier-separated) HOV lanes.

APPENDIX F

US 50 High Occupancy Vehicle/ Bus-Carpool Lanes Project

Sacramento, CA

Caltrans District 3

By: Wood Rodgers, Inc.
Mark Rayback
Nawid Nessar
Mario Tambellini

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Presentation Summary

- Project Background
- Purpose and Need
- Project Alternatives
- Data Collection
- Travel Demand Forecast Models
- Vissim Microsimulation Models
- Findings

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Project Background

- US 50 is a primary interregional east-west route.
- Current US 50 HOV Lane: Watt Ave. (Sacramento County) to Cameron Park (Shingle Springs), 28 miles.
- This Project: Adds HOV Lanes on US 50 between Downtown Sacramento and Watt Ave., 7.7 miles.

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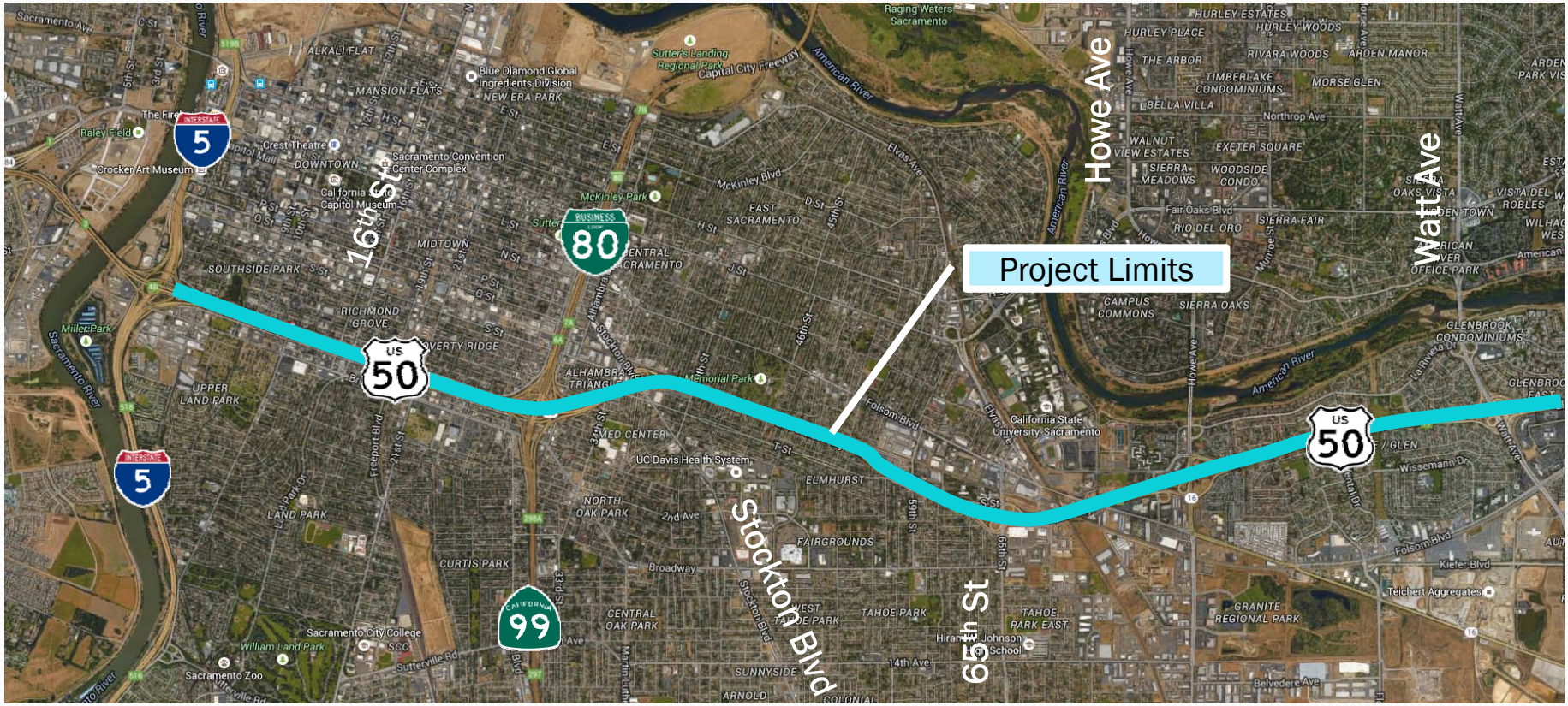
Project Area and Limits



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Purpose and Need

- **Need:** This project is needed because the US 50 corridor is experiencing recurring congestion during peak commute periods. The amount and duration of congestion is expected to increase in the future as suburban development continues in the eastern portions of Sacramento County and in El Dorado County.
- **Purpose:** The purpose of the project is to reduce congestion on US 50 from Sacramento County at Watt Avenue Interchange to the I-5 Interchange in downtown Sacramento.

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Purpose and Need (Cont.)

- Additional objectives to this project are as follows:
  - Allow connectivity and consistency with the planned HOV system in the Sacramento Region
  - Enhance mobility and provide incentives for ridesharing during peak period travel
  - Achieve the goals of the current SACOG MTP by promoting ridesharing
  - Improve US 50 to meet the growing travel demand in the Sacramento Region
  - Provide an option for reliable peak period travel time
  - Use the highway facilities as efficiently as possible
  - Improve general traffic operations by reducing congestion and travel time
  - Improve bicycle and pedestrian access

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Four Project Alternatives

- **Alternative 1 - HOV Lanes:**
  - Add EB/WB HOV lanes in the Project area.
- **Alternative 2 - Mixed Flow Lanes:**
  - Add EB/WB Mixed-Flow lanes in the Project area.
- **Alternative 3 - Take-a-Lane:**
  - Convert #1 EB/WB lanes to HOV in the Project area.
- **Alternative 4 - No Build:**
  - No change to US 50 mainline.

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Data Collection (Fall 2013)

- 14 - Freeway Mainline Counts
- 73 - Freeway On-/Off-Ramp Counts
- 17 - Freeway Connector Counts
- 48 - Ramp Intersection Counts
- 10 - Travel Times
- Video and Radar Data Collection
- Manual and Machine Automated Data Collection
- Axle Classification Counts
- Vehicle Occupancy Counts
- Caltrans Performance Measurement System (PeMS)

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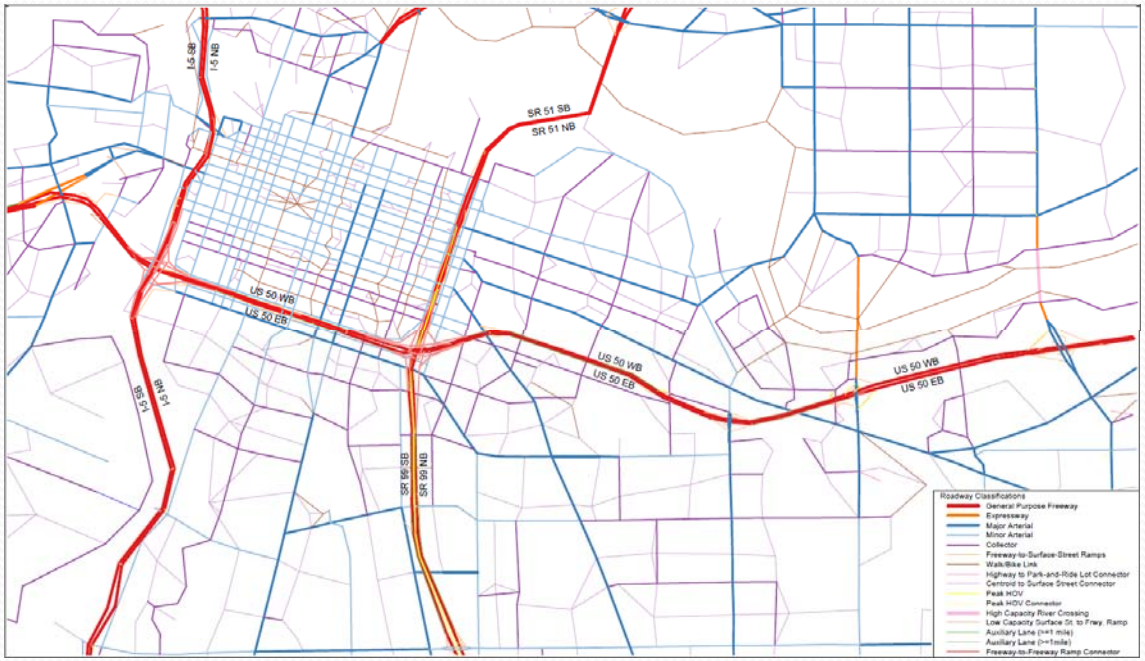
Travel Demand Forecast Model

- Sacramento Area Council of Governments' (SACOG) Sacramento Activity-Based Travel Simulation Model (SACSIM11) (*Cube 6.0* Software)
- Simulates regional travel demand.
- SACSIM model was calibrated to existing data in the Project area.



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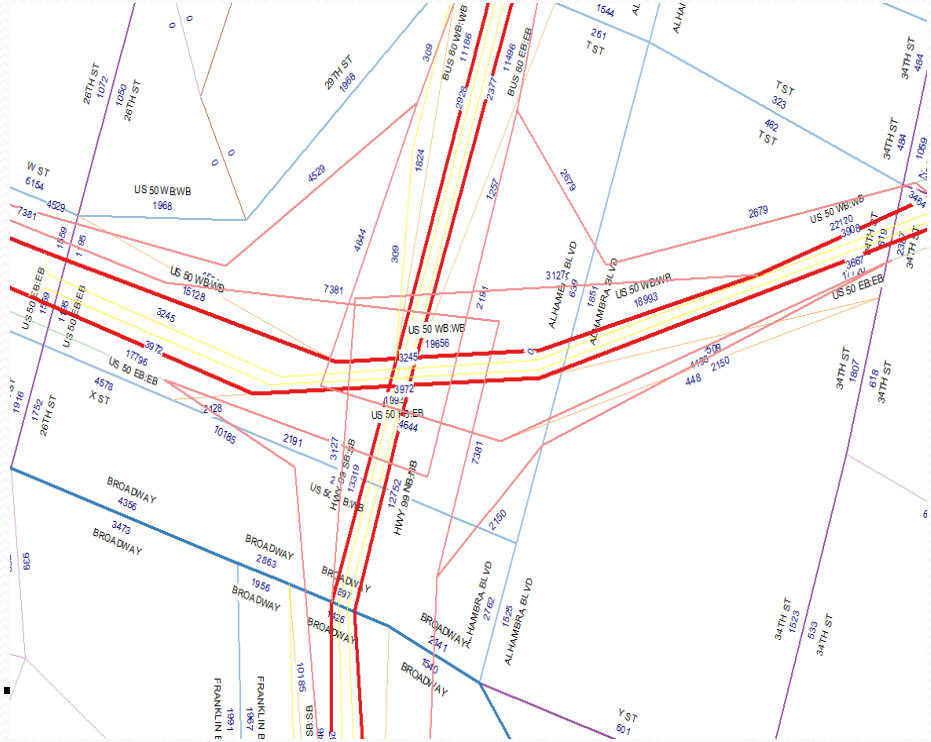
Travel Demand Forecast Model (Cont.)

- Future year models were developed for each project alternative.
- Incorporated future programmed projects and future land uses based on SACOG's projected buildout.
- AM and PM peak period future year forecasts were developed for all alternatives.
  - Included HOV percentage forecasts.



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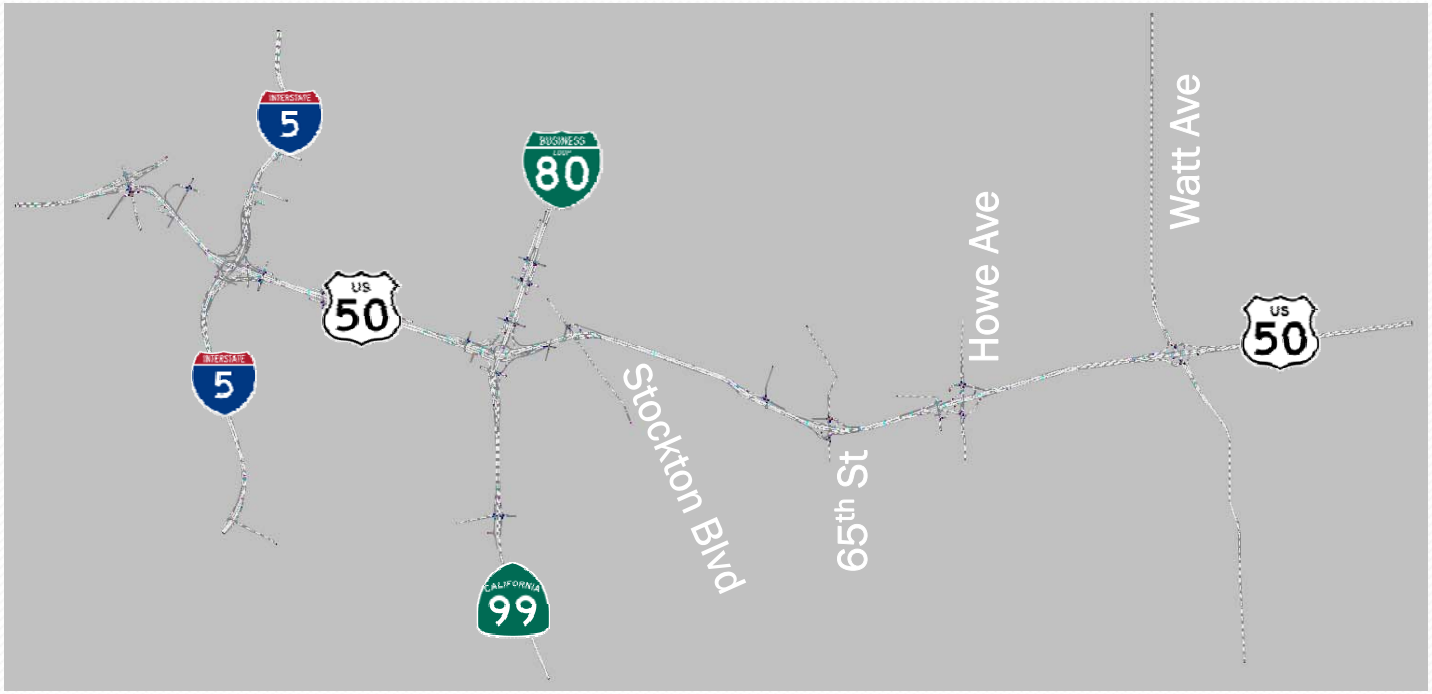
Vissim Microsimulation Model

- *PTV Vissim* Software (ver. 6.00-15)
- US 50, I-5, SR 51 and SR 99 were modeled



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Vissim Microsimulation Model (Cont.)

- Created a calibrated and validated Base Year model.
- Created future year models for each Alternative.
- Incorporated future programmed projects.
- The microsimulation models were used to project future year traffic performance measure data in the study area under all four project alternatives, including:
  - vehicles served
  - persons served
  - speeds
  - densities
  - level of service
  - travel times

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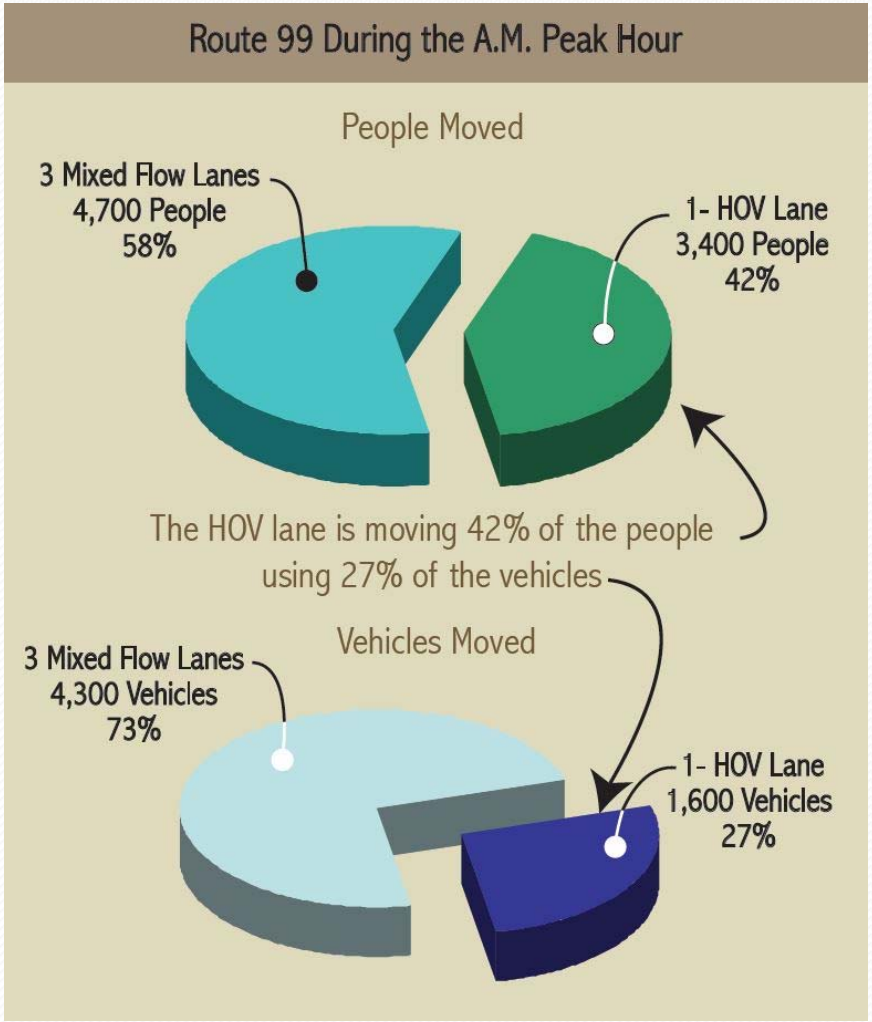
Findings

- HOV Lane Utilization (Based on nearby SR 99 HOV lanes during the AM peak hour).
- HOV lanes generally carry more people in fewer vehicles.



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Findings (Cont.)

- Year 2040 4-Hour Peak Period Study Area Findings:

(Study Area includes both directions of US 50, I-5, SR 99, & Business 80 in Downtown Sacramento)

Time of Day	Performance Measure	Change in Performance Measure vs. No Build			
		Alternative 1 (HOV Lanes)	Alternative 2 (Mixed Flow Lanes)	Alternative 3 (Take-a-Lane)	Alternative 4 (No Build)
AM 4-Hour Peak Period	Vehicles Served in Relation to Alt. 4	+6,500	+10,500	-13,000	0
	Persons Served in Relation to Alt. 4	+31,000	+16,500	-2,500	0
	Person Miles of Travel in Relation to Alt. 4	+109,000	+73,000	-41,000	0
PM 4-Hour Peak Period	Vehicles Served in Relation to Alt. 4	+11,000	+7,000	-15,500	0
	Persons Served in Relation to Alt. 4	+40,000	+11,000	-6,500	0
	Person Miles of Travel in Relation to Alt. 4	+145,500	+82,500	-57,000	0

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Findings (Cont.)

- Year 2040 Study Area **Unserved** Vehicles:

Peak Period	Study Area Freeway Demand	Unserved Demand			
		Alternative 1 (HOV Lanes)	Alternative 2 (Mixed Flow Lanes)	Alternative 3 (Take-a-Lane)	Alternative 4 (No Build)
AM Peak Period	346,500	27,500	23,500	47,000	34,000
PM Peak Period	414,000	42,500	46,500	69,000	53,500

- Any unserved demand may take alternative routes / local roads, and/or be served at a later time.
- Alt. 1 and Alt. 2 may reduce congestion on local roads by reducing unserved demand compared to No Build (Alt. 4).

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Findings (Cont.)

- Year 2040 Daily VMT on the US 50 Project Corridor:

(US 50 between Watt Avenue and I-5)

Daily Performance Measure	Alternative 1 (HOV Lanes)	Alternative 2 (Mixed Flow Lanes)	Alternative 3 (Take-a-Lane)	Alternative 4 (No Build)
VMT	2,730,000	2,733,000	2,602,000	2,618,000
Persons Served	337,000	322,000	315,000	307,000
VMT per Person	8.1	8.5	8.3	8.5

- Alt. 1 results in the lowest VMT per Person of any Alternative (~5% less than Alts. 2 and 4).

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Findings (Cont.)

- Improved US 50 Travel Times
- Year 2040 WB US 50 - PM Peak Period Travel Times experience the highest improvements:

Travel Time Route	Change in Travel Time vs. No Build (minutes)			
	Alternative 1 (HOV Lanes)	Alternative 2 (Mixed-Flow Lanes	Alternative 3 (Take-a-Lane)	Alternative 4 (No Build)
WB US 50 at Watt Ave to NB I-5 at Richards Blvd	-5.5	-7.5	-3.5	0.0
WB US 50 at Watt Ave to WB I-80 at West Sacramento	-7.0	-9.5	-4.5	0.0
WB US 50 at Watt Ave to SB I-5 at Sutterville Rd	-5.5	-8.5	-5.0	0.0
WB US 50 at Watt Ave to SB SR 99 at 12th Ave	-7.0	-9.5	-2.0	0.0
WB US 50 at Watt Ave to NB US 51 at E St	-4.0	-7.0	-3.0	0.0

- Alt. 2 shows a slightly better time savings than Alt. 1 due to the larger impact on travel times of mixed-flow vehicles.

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Findings (Cont.)

- Improved HOV/Bus Travel Times (Year 2040 PM Peak Period)

Scenario	HOV/Bus Travel Time (minutes)			
	Alternative 1 (HOV Lanes)	Alternative 2 (Mixed-Flow Lanes	Alternative 3 (Take-a-Lane)	Alternative 4 (No Build)
Average EB/WB US 50 Travel Time Through Study Area	15	19	18	22
Change in Travel Time vs. No Build	-7	-3	-4	0

- HOVs/Buses are projected to experience a reduction in travel time of approximately 7 minutes with construction of HOV Lanes (Alt. 1).

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Findings (Cont.)

- EB US 50 travel times are similar for all Alternatives.
- This is due to:
  - increased demand
  - increased served vehicles and people
  - congestion that occurs under future year conditions at ramps and connectors
  - queuing and congestion that occurs on mainline US 50 (at bottlenecks) under future year conditions and extends beyond modeled limits

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Findings (Cont.)

- Benefits of Constructing HOV Lanes Over Time:

Alternative	Average US 50 PM Peak Hour Mainline Speed (mph)		
	Year 2020	Year 2030	Year 2040
Alternative 1 (HOV Lanes)	49	42	42
Alternative 4 (No Build)	44	39	39
Difference	**+5**	**+3**	**+3**

Alternative	Average US 50 PM Peak Period Travel Time (minutes) (Watt Avenue to I-5)		
	Year 2020	Year 2030	Year 2040
Alternative 1 (HOV Lanes)	12	19	22
Alternative 4 (No Build)	16	24	29
Difference	**-4**	**-5**	**-7**

Note: All values shown are for US 50 in the Project Area.

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Findings (Cont.)

- Benefits of Constructing HOV Lanes Over Time:

Alternative	Average US 50 PM Peak Period Mainline Persons Served		
	Year 2020	Year 2030	Year 2040
Alternative 1 (HOV Lanes)	65,000	71,000	75,000
Alternative 4 (No Build)	61,000	66,000	67,000
Difference	**+4,000**	**+5,000**	**+8,000**

Note: All values shown are for US 50 in the Project Area.

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Findings (Cont.)

- Summary of Benefits from Adding HOV Lanes as Compared to No-Build (under Year 2040 conditions):
  - 17,500 more vehicles and 71,000 more persons served in the Sacramento Area during the peak periods.
  - 254,500 more person miles of travel during the peak periods but 5% less daily VMT per person.
  - Reduced congestion on nearby local roads.
  - An average reduction of travel times on WB US 50 of approximately 6 minutes per vehicle during the PM peak period.

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APPENDIX G

Year 2040 4-Hour Peak Period Study Area Findings:

Time of Day	Performance Measure	Change in Performance Measure vs. No Build			
		Alternative 1 (HOV Lanes)	Alternative 2 (Mixed Flow Lanes)	Alternative 3 (Take-a-Lane)	Alternative 4 (No Build)
AM 4-Hour Peak Period	Vehicles Served in Relation to Alt. 4	+6,500	+10,500	-13,000	0
	Persons Served in Relation to Alt. 4	+31,000	+16,500	-2,500	0
	Person Miles of Travel in Relation to Alt. 4	+109,000	+73,000	-41,000	0
PM 4-Hour Peak Period	Vehicles Served in Relation to Alt. 4	+11,000	+7,000	-15,500	0
	Persons Served in Relation to Alt. 4	+40,000	+11,000	-6,500	0
	Person Miles of Travel in Relation to Alt. 4	+145,500	+82,500	-57,000	0

Additional discussion of above alternatives comparison:

- The above results are correct. The year 2040 Option 1 PM peak period model results presented in the Final US 50 HOV Lanes Report (Table 59) show 371,637 vehicles served for the HOV Lanes Alternative and 367,623 vehicles served for the Mixed Flow Lane Alternative (i.e. the HOV Lanes alternative is projected to serve approximately 4,000 more vehicles than the Mixed Flow Lane alternative under year 2040 PM peak period conditions).
- Note that the values shown above are for the entire study area network (US 50 as well as parts of I-5, SR 99, and SR 51 in the Sacramento Area).
- Year 2040 PM peak period is the most congested scenario analyzed and the network experiences more demand than it can serve, leading to bottlenecks, congestion, and delay.
- The Mixed Flow Lanes Alternative was assumed to have the highest demand of all the alternatives. There are more vehicles trying to use the freeway network under the Mixed Flow scenario than under the HOV Lanes scenario, which leads to increased bottlenecks during the peak period and can result in slightly less vehicles being served overall. Since the network is operating at capacity, the additional vehicle demand likely had a negative impact on vehicles served.